MICAL
RARY

The Week of July 28th, 1931, Has Been Designated for the 79th Annual Meeting of the American Pharmaceutical Association—Columbus Hotel, Miama, Fla., Has Been Named the Headquarters Hotel; The Local Secretary Is G. H. Grommet, 2364 S.W. 11th St., Miama, Fla.

SEP 9 1930

Vol. XIX, No. 9 SEPTEMBER, 1930

JOURNAL

OF THE

AMERICAN PHARMACEUTICAL ASSOCIATION

TRADE MARK

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THE 79th ANNUAL MEETING OF THE AMERICAN PHARMACEUTICAL ASSOCIATION WILL BE HELD IN MIAMI, FLA., DURING WEEK OF JULY 28th. HEADQUARTERS, COLUMBUS HOTEL. LOCAL SECRETARY, G. H. GROMMET, 2364 S.W. 11th ST., MIAMI.

The 1931 Meetings of the American Association of Colleges of Pharmacy, the National Association of Boards of Pharmacy, Conferences of Pharmaceutical Association Secretaries and of Pharmaceutical Law Enforcement Officials will also be held at Miami, same time and place. The Plant Science Seminar will be held at Gainesville, Fla., during the week of July 21st.

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BODY, MIND AND SOUL.

Extracts from an address at the 1930 meeting of the Canadian Pharmaceutical Association.

BY THEODORE J. BRADLEY.

AT many of our pharmaceutical association meetings, commercial topics make up the greater part of the programs, and no fault should be found with this condition. There is no incompatability between good pharmacy and good business practice, but these topics nourish only the *body* of pharmacy.

It is instinctive for us to care for our bodies first, and unthinking creatures of the lower orders feel the need for nothing more. As man has advanced from a lower order of being, however, he has learned that he has more than a body; he has a mind and a soul, which must be cultivated and nourished also.

Pharmacy has a mind and a soul, as well as a body. Scientific training and knowledge constitute the mind of pharmacy, and our professional spirit constitutes its soul, while business practice is the body.

In the recent great development of the commercial aspects of pharmacy, many pharmacists appear to have forgotten the professional spirit, which differentiates us from other tradesmen and is one of our most precious possessions. Besides the satisfaction we should feel with our professional standing, it has a more tangible value in the power it gives us to prevent the development of chain stores in pharmacy to the extent that they have developed in other lines of trade. If we can convince the public and the law-makers that pharmacy is a profession that can be practiced only by properly qualified individuals, even though it has a commercial side, many of our difficulties will be overcome; but we cannot expect to do this if we do not understand and believe it ourselves.

The pharmacist of the future must adapt himself to changing conditions. He must have a good general education, special scientific training, and a sound knowledge of commercial practices, to enable him to take his place as a citizen, a professional practitioner, and a man of business.

Pharmacists in our time have many difficulties, but these difficulties are no greater than our predecessors had to contend with, and we can face the future confidently, secure in the knowledge that pharmacy must continue to prosper because our services are essential to the well-being of the public.

THOMAS ROACH.

JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION

VOL. XIX SEPTEMBER, 1930 No. 9

THE PRESIDENT OF THE NATIONAL ASSOCIATION OF RETAIL DRUGGISTS.

Thomas Roach, president of the National Association of Retail Druggists, will celebrate the 50th anniversary of his birth, October 29th. He is a native of the Big Bend State and came to Oklahoma City soon after reaching his majority. His early education was received in his native state and, later, he was employed in the drug store of R. F. Cannon, of Atwood. Coming to Oklahoma City, in 1901, he registered as pharmacist and served as drug and prescription clerk until 1906, when he formed a partnership with S. F. Veasey; this firm continued until 1917, when the latter acquired, by purchase, the interest of his partner. Mr. Roach then bought a store on West Main St., Oklahoma City, and this he sold to Steinberg Drug Company in 1929.

The latter sale gave Mr. Roach the opportunity he had been waiting for, namely, to engage in professional pharmacy, exclusively, after having been successful in the ownership and conduct of a "modern drug store;" of this class of business establishments he said: "Certainly no class of business or profession can lay claim to a greater usefulness than the modern drug store."—See JOUR. A. PH. A., October 1929, page 1014; March 1930, page 296 and June, page 580. His preference, however, is to serve as pharmacist and he is pleased with the success of his undertaking.

President Roach evidences his belief in the importance of organizations by participating in their work, and believes in coöperation of associations as well as of individuals. He is a former president of Oklahoma Pharmaceutical Association and is now serving in the highest office of the National Association of Retail Druggists and will preside over and direct its deliberations at its Atlantic City meeting.

He is *vice-chairman* of the House of Delegates, and member of a number of important committees of the AMERICAN PHARMACEUTICAL ASSOCIATION, among them that on A. PH. A. Recipe Book and on Pharmacy Corps in the Medical Department of the U. S. Army.

The home of Mr. and Mrs. Roach is graced by two daughters and a son.

EDITORIAL

E. G. EBERLE, EDITOR 10 West Chase St., BALTIMORE, MD.

THE PHARMACIST IN PUBLIC HEALTH ACTIVITIES, IN CIVIC AND GOVERNMENT SERVICE.

THE enactment of the Parker Bill into law gave recognition to pharmacy by placing pharmacists on the same basis—as to appointment, pay, promotion, disability privileges, etc.—as medical officers. The bill was before Congress for several years; later, passed and vetoed; but it is now a law. The original bill did not provide commissions for pharmacists, for which the AMERICAN PHARMACEUTICAL ASSOCIATION and related organizations contended. The Surgeon General gave his endorsement to the measure as finally passed and he received the whole-hearted support of the ASSOCIATION.

Progress is now being made under the law and examinations have been held. E. M. Holt and E. B. Scott, both of Washington, who for a number of years have been pharmacists in the Public Health Service, under Civil Service status, have received commissions in the regular commissioned corps, after having successfully passed the required physical and professional examinations. They are the first two pharmacists to receive commissions and have been named by Surgeon General Cumming to conduct the examinations necessary for eligibles in the corps.

The Modern Hospital for August says editionally that "under the leadership of its president, Dr. William Gerry Morgan, the American Medical Association has entered vigorously upon a program of hospital reform."

Accidents will occur, but every effort should be made to prevent them. We have before us several resolutions deploring errors which caused deaths in hospitals, in different localities, which could have been prevented by qualified pharmacists. It is unpleasant to refer to the occurrences, but it is to be hoped that the provisional standards will demand that qualified pharmacists be in charge of the pharmacies in hospitals; without such provision unqualified men and women will be assigned duties which endanger human life—constituting an injustice to them and to the patients. To place unqualified persons in such responsible positions comes very close to an unjustifiable disregard of protection—a hindrance to professional advancement and service. We have reason to believe that physicians, as a class, desire highly qualified pharmaceutical service, because it serves and protects them, and gives them opportunities in research and development of hospital studies. It is to be hoped, therefore, that in the essentials for hospitals, the pharmacy and pharmacists will not be overlooked, because the advancement of pharmacy and its encouragement benefit the practice of medicine.

"THE QUALITY OF MEN IN PHARMACY OF FIRST IMPORTANCE."

THE qualifications of moral character expressed in pharmacy laws are nearly as important as those acquired by education and training. Our profession places in the hands of its votaries moral obligations of a high standard, and he whose character permits him to trifle with human life or health, or encourage the frailties of human nature, should not be given the privilege of becoming a pharmacist,

and it may be questioned whether one who does not fully realize the obligations assumed in handling drugs and medicines should be permitted to deal in them. The latter reference brings us to a purpose of this comment.

An object in the organization of the AMERICAN PHARMACEUTICAL ASSOCIATION was to safeguard the public by providing the means through education and legislation whereby drugs and medicines would be standardized and the dispensing of them regulated. The purpose also came into evidence when, long before the public realized the dangers of drug addiction, pharmacists studied the conditions and suggested and worked for means of correcting the evil and restricting the sale and dispensing of narcotics.—See A. PH. A. PROCEEDINGS, 1902, earlier and succeeding annuals.

The ASSOCIATION seeks to coöperate with those who study public health conditions, and it is for that reason an article is published in this issue of the JOURNAL, entitled "Adulterated Ginger Responsible for Recent Paralysis Epidemic." No member of this ASSOCIATION and we are hopeful no member of any other association of the drug-trade activities had a part in the traffic which brought death and ill health to quite a number but, unfortunately, there are some who either do not care, or do not realize the dangers that may obtain in the use of unknown drugs; they will take a chance because it is a means of making money. It is estimated that more than 15,000 individuals were victims of the product discussed; a comparatively small number died from the effects, the greater number suffered in varying degrees from paralysis. A purpose of the article is to acquaint pharmacists with the fact that tri-ortho cresyl esters were responsible for the cases of "ginger paralysis"(?) and also to suggest further study of the action by phenol esters in the human body.

In again citing the aims and purposes of the organization of the AMERICAN PHARMACEUTICAL ASSOCIATION and its watchfulness over developments in professional pharmacy, liberty is taken in referring to the August JOURNAL, pages 908–910, where brief report is made of a conference for the discussion of better control of narcotic drugs. The following excerpts from the Constitution of the ASSOCIATION may be applicable:

"To improve and regulate the drug market, by preventing the importation of inferior adulterated or deteriorated drugs, and by detecting and exposing home adulterations. To encourage such proper relations among Druggists, Pharmacists, Physicians and the people at large, as may promote the public welfare, and tend to mutual strength and advantage.

"To improve the Science and Art of Pharmacy by diffusing Scientific knowledge among Apothecaries and Druggists, fostering Pharmaceutical literature, developing talent, stimulating discovery and invention, and encouraging home production and manufacture in the several departments of the drug business.

"To suppress empiricism, and to restrict the sale and dispensing of medicines to regularly educated Druggists and Apothecaries.

"To create and maintain a standard of professional honesty equal to the amount of our professional knowledge, with a view to the highest good and greatest protection to the public."

In closing this comment the following paragraphs from an Editorial in the February issue, 1928, are repeated:

In all court decisions in which restrictive measures that apply to the sales of medicine are involved there is a question of safeguarding the life and health of the citizens; hence, aside from provisions which give such protection through

qualified pharmacists it is of equal importance that druggists be observant of their professional obligations and desirous of serving. The progress of the drug industries depends not only on the regulation of its trade practices, reasonable observation of its codes of business and professional ethics, but on bringing into active coöperation all of its divisions.

Comment has been made in previous issues of the JOURNAL relative to sales of medicines by others than pharmacists; the guiding thought in the decisions bearing thereon has been of late, if not in the past, the greater safety and better service rendered by those qualified by education and training. Unless there is more involved than handing out a package, more than an ordinary sale wherein one salesman has no better understanding than another of what the package contains, the decisions have not favored restriction; but in cases wherein knowledge gave the public protection, the decisions rendered have, by inference if not otherwise, stated the importance of pharmaceutical service.

THE THREE HUNDREDTH ANNIVERSARY OF THE FIRST RECOGNIZED USE OF CINCHONA.

THE Missouri Botanical Garden has issued a preliminary program for the celebration of the 300th anniversary of the first recognized use of Cinchona and the celebration is fixed for the last day of October and the first day of November of this year. There is to be an exhibition of books, pictures, crude materials and drugs pertaining to Cinchona. Prof. Leo Suppan is to speak of the history of the drug, Dr. Edward Kremers of its constituents, Dr. Dock of its medicinal use. Dr. M. Kerbosch, director of the Government Cinchona Estate and Cinchona Experiment Station (Java) is to speak of "The Cinchona Industry of Java," and Dr. Wilbur L. Scoville of "The Pharmaceutical Preparations of Cinchona;" Dr. Frederic Rosengarten has as his subject "Minor Alkaloids of Cinchona Bark," Dr. Torald Sollman "The Cinchona Alkaloids in Medical Science," and Dr. Kenneth F. Maxcy will discuss "The Present Conception of the Action of Quinine and Malaria."

The first authentic record of the use of Cinchona bark dates back to 1630 when Francisco Lopez de Canizares, Corregidor of Loxa, was cured of the fever by its use; the wife of the Spanish Viceroy of Peru, Countess Ana of Chinchon, about ten years later, brought some of the bark to Spain; the first general introduction of the drug into Europe was by the Order of Jesuits. These references give us four names applied to Cinchona—"Peruvian Bark," "Loxa Bark," "Jesuits' Powder," Cinchona. About 100 years after the experiences referred to, the source of Cinchona became known through Charles Marie de La Condamine, a French scientist who had gone to South America with Pierre Bouguer and Louis Godin for an entirely different purpose; namely, to measure an arc of the meridian on the plain of Quito; aside from bringing back specimens of the tree, which he described, he also made the rubber tree known in Europe.

In 1820, Pelletier and Caventou, French pharmacists, demonstrated the alkaline character of the principle discovered by Bernardino Antonio Gomez, a Portuguese physician and botanist, and gave it the name of cinchonine.

Reference is made in "Flueckiger's Letters to Power, 1882–1890"—JOUR. A. PH. A., 19 (1930), 879 to "Chinarinden," by the former; later, translated by Dr. Power—see April JOURNAL, 1922, page 381, also "Centenary of F. A. Flueckiger," June 1928, page 615. The selections made for the program speak for an interesting celebration and the Director and Trustees of The Missouri Botanical Garden are to be congratulated on the motive which prompted them to undertake it.

PROGRESSIVE RESULTS OF PHARMACY'S RECOGNITION IN GOVERNMENT SERVICE.

IT has been said before in these columns that the basic standard of pharmaceutical progress is in the employment and development of the energies of the individual pharmacists, and in the realization and exercise of their respective powers alone, or in coöperation with others through a combination of single and collective activity. It is in that spirit that the AMERICAN PHARMACEUTICAL ASSOCIATION entered into the movement for securing better recognition for pharmacists in Government Service, knowing that thereby and by raising the standards of pharmacy better service would be possible.

Having gained recognition by the commissioning of pharmacists in a most important service, we may look for further progress if it is shown that better service is rendered by the selection of trained pharmacists and that better protection is afforded to the men and women in Government services. It follows, however, that to the degree in which the individual pharmacists fail to develop their opportunities, to that extent the individuals and pharmacy lose. Pharmacists can be selected who will meet the requirements of duties to be assumed, and the measure of their confidence and assurance will have a large part in the progress which pharmacy will make in other directions. The recognition means much—it will encourage others to enter the service which they will honor, who are prepared for the work by education and training, and will reflect credit on themselves and their profession. It may be that men who have served long and faithfully deserve preferential favor or recognition, which may be deemed justifiable in instances; certain it is that the educational and training requirements should become fixed and progressive, for the good of the Service and of pharmacy. The most effective results come through the helpful coöperative efforts of all concerned.

The interest and purpose of the AMERICAN PHARMACEUTICAL ASSOCIATION is founded on assurance of qualified service and merit which deserves distinction. It congratulates those who have been commissioned and hopes for the success of others. Its efforts along related lines[1] will be continued with sincerity of purpose.

TIME, PLACE AND HEADQUARTERS HOTEL FOR THE 1931 A. PH. A. MEETING.

AFTER a spirited contest at the Baltimore meeting, Miami was chosen as the place for the 1931 meeting of the ASSOCIATION. The Florida pharmacists

[1] See August JOURNAL A. PH. A., page 907.

promptly organized a local committee to have charge of arrangements for the meeting and to develop interest in it.

President H. C. Christensen visited Miami in August and made a careful study of local conditions with the members of the Committee. It was fortunate that this visit was made during the summer season and at approximately the time the meeting will be held next year.

The Local Committee recently recommended that the meeting be held during the week of July 27th to August 1st and that the Columbus Hotel be the Headquarters. The Council has approved both recommendations. Most of the state association meetings will have been held prior to the date chosen and there will be time after the meeting for the many side trips that may be arranged under the liberal traveling provisions that will be granted. The Local Committee is already planning an excursion to Havana and other points of interest in Cuba following the meeting.

There will be a full moon during the week of the meeting. This will be a treat to those who have not enjoyed it in that locality. The Local Committee is arranging that their visitors will see everything of interest in Miami and the surrounding country, one of the wonderful playgrounds of the world.

The Columbus Hotel is a modern hotel, built to provide every comfort for its guests and those attending the business sessions. Several other large hotels are nearby, insuring ample accommodations.

The Florida Pharmaceutical Association will hold its annual meeting in Miami during the week of the AMERICAN PHARMACEUTICAL ASSOCIATION meeting which will be an added and very interesting feature.

E. F. KELLY, *Secretary.*

OFFICERS-ELECT OF THE AMERICAN PHARMACEUTICAL ASSOCIATION FOR 1931–1932.

The Board of Canvassers of the AMERICAN PHARMACEUTICAL ASSOCIATION, composed of T. C. Marshall, J. B. Pendergrast and Sinclair Jacobs, all of Atlanta, Ga., has announced as the result of the mail ballot for officers of the ASSOCIATION, the election of the following:

President, Walter D. Adams, Forney, Texas.

First Vice-President, J. G. Beard, Chapel Hill, N. C.

Second Vice-President, J. W. Dargavel, Minneapolis, Minn.

Members of the Council (for three years), H. A. B. Dunning, Baltimore, Md.; S. L. Hilton, Washington, D. C.; Ambrose Hunsberger, Philadelphia, Pa.

These officers will be installed at the next annual meeting of the ASSOCIATION which will be held in Miami, Florida, during the week of July 28, 1931.

The *1932* meeting will be held in Toronto, Canada, and will be a joint meeting with the Canadian Pharmaceutical Association.

September 9, 1930 E. F. KELLY, *Secretary.*

SCIENTIFIC SECTION

THE CITRIC ACID "ASSAY" OF SOLUTION OF MAGNESIUM CITRATE, U. S. P.*

BY H. V. ARNY[1] AND HUGO H. SCHAEFER.[1]

INTRODUCTION.

Reference to the monograph on Solution of Magnesium Citrate, as given in the present (tenth) revision of the United States Pharmacopœia, indicates the presence of a test not found in U. S. P. IX. This is so-called "assay" for citric acid. The present monograph does not call it an assay but labels its two sentences "*minimum of acidity*" and "*minimum of total citric acid,*" respectively. This phraseology was used because certain members of the sub-committee on inorganic chemicals of the U. S. P. Revision Committee considered the test too experimental and possibly too empirical to dignify with the word "assay."

The need of some sort of an assay showing the citric acid content of solution of magnesium citrate became apparent in connection with the work of the senior author as chemist of the Board of Pharmacy of the State of New York. This work (performed prior to 1920) included examination of the citrate of magnesia solution both for MgO and for citric acid content. Results showed that while most of the samples picked up in the drug stores of New York were up to requirements of U. S. P. IX as to magnesium oxide, in the case of samples manufactured by some of the large concerns specializing in this product, the citric acid content was twenty per cent below the 33 Gm. per bottle required by U. S. P. IX. This work performed in 1917 by H. J. Goeckel and the senior author using the Mayer method of "assay" (to be discussed later) gave the following results:

TABLE I.

Source of the Solution of Magnesium Citrate.	Total Citric Acid per 350-cc. bottle.	Source of the Solution of Magnesium Citrate.	Total Citric Acid per 350-cc. bottle.
Made by operators in exact accord with the recipe of U. S. P. IX	34.447 Gm.; 34.939 Gm.	Samples prepared by one manufacturer	25.09 Gm. 1 sample
			25.558 Gm. 1 sample
			25.585 Gm. 3 samples
			26.07 Gm. 2 samples
One retail pharmacy sample	33.46 Gm.		26.327 Gm. 1 sample
			26.57 Gm. 4 samples
			26.79 Gm. 1 sample
			27.55 Gm. 1 sample
			28.049 Gm. 1 sample
			28.539 Gm. 1 sample
			29.02 Gm. 1 sample

The foregoing figures convinced the members of the sub-committee on inorganic chemicals of the U. S. P. Revision Committee (1920–1930) of the need of a proper control of citric acid in the official solution and the Mayer "assay" process (JOUR. A. PH. A., 9 (1920), 253) was chosen as the best test available. This test

* Scientific Section, A. Ph. A., Baltimore meeting, 1930. No discussion.

[1] 115 W. 68th St., New York City.

after undergoing some modifications at the hands of some members of the Revision Committee finally appeared as tests for "minimum of acidity" and of "total citric acid" on page 219 of U. S. P. X. It can be condensed to the following concise statements:

Measure off 10 cc. of the solution; boil down to 5 cc.; titrate with $N/2$ NaOH; indicator, phenolphthalein. It should require not less than 9.5 cc. $N/2$ NaOH for neutralization (*free acidity*).

Evaporate the neutralized liquid to dryness, ash to a white residue, add 50 cc. of distilled water and titrate with $N/2$ H_2SO_4; indicator, methyl orange. It should require not less than 28 cc. $N/2$ H_2SO_4 (*total citric acid*).

THE OFFICIAL TEST.

The test as finally approved by the Revision Committee and as outlined above was the result of work performed in 1923 by the senior author and his pharmacopœial assistant Miss Elizabeth Kish. These experiments were performed upon three samples:

A. Made in our laboratory by the recipe of U. S. P. IX;
Magnesium carbonate, 15 Gm.; citric acid, 33 Gm. per 350-cc. bottle.

B. Made in our laboratory by the recipe of U. S. P. X;
Magnesium carbonate, 15 Gm.; citric acid, 35 Gm. per 350-cc. bottle.

C. The commercial product cited above.

The results of assays of these three products are given below:

TABLE II.

Solution.	Free.	Total.	Solution.	Free.	Total.
A.	10.10	32.62	C.	10.00	29.20
	10.10	32.62		10.00	29.60
	10.10	32.71		10.00	29.56
B.	11.88	34.80		10.00	29.50
	11.88	34.33		10.00	29.60
	11.88	34.58			
	11.88	34.58			

In anticipation of litigation in which the accuracy of the "assay" was likely to be attacked, in 1928, with the assistance of Mr. C. H. Soren, we ran a series of MgO and citric acid determinations on four samples of solution of magnesium citrate made in our laboratory from three different samples of citric acid and two samples of magnesium carbonate. These chemicals were assayed prior to using them in preparing the several batches of solution and their percentage strengths are given below:

Magnesium Carbonate.		Citric Acid.	
Sample No.	MgO Content.	Sample No.	$H_3C_6H_5O_7.H_2O$ Content.
1	40.8%	1 (effloresent)	107.3%
2	39.9%	2	100.1%
		3	99.8%

The five samples of finished solution at the time of preparation gave the assay figures in Table III.

The effect of aging was studied in connection with the work; four of the samples being opened at intervals during four weeks, carefully stoppered after each opening and the contents assayed for both MgO and citric acid.

TABLE III.*

Solution.	Solution (350 cc.) made from 15 Gm. MgO.	35 Gm. Citric Acid.	Assay figures 350 cc. solution. $H_3C_6H_5O_7.H_2O$. Free.	Total.	MgO.
A	No. 1	No. 2	12.63	35.5	1.88
B	No. 2	No. 1	14.97	37.2	1.81
C	No. 2	No. 3	14.7	34.07	1.85

As expected the MgO content remained practically stable. The citric acid figures are given below:

TABLE IV.*

Gms. total Citric Acid per 350-cc. bottle.

Sample No.	Fresh.	After 1 week.	After 2 weeks.	After 4 weeks.
A	35.5	34.8	35.0	34.8
B	37.2	36.5	36.0	34.2

* The work reported in Tables III and IV, being somewhat hurried, will be repeated in more extended fashion by one of us (H. H. S.) during the coming year.

The foregoing table indicates that while deterioration occurs when solution of magnesium citrate is kept for four weeks in a partially filled bottle at room temperature, this deterioration is less than ten per cent.

There have been some questions raised as to the effect of heat during ashing upon the ash titration and upon the subsequent calculation of citric acid content. As all of our ashing operations are carried on in a muffle oven and as the differentiation between dull red heat, red heat and white heat is easily discernable, in such ovens, we assayed the batches of the same sample both at "dull red heat" prescribed by the Pharmacopœia and also at white heat. The sample, purchased from a high-grade prescription pharmacy, assayed for MgO, on three runs gave 1.80, 1.80 and 1.78 per cent; the free acid titrations ran (for 10 cc.) 11.0, 11.2 and 11.0 cc. of $N/2$ NaOH. The figures for the titrations of the ash follow:

TABLE V.

Expressed in terms of Gm. per 350-cc. bottle.

Dull red heat 1 hour.	White Heat ½ hour.	White Heat 1 hour.	White Heat 2 hours.
36 Gm.	35.4 Gm.	31.6 Gm.	31.0 Gm.

This indicates that the "dull red heat" direction of the Pharmacopœia must be observed but that even white heat for one-half hour does not produce more than a 2 per cent discrepancy.

COMMENTS ON THE TEST.

The work on aging and on heat of ashing were performed in preparation of litigation involving one of the manufacturers of solution of magnesium citrate who defied the citric acid assay of U. S. P. X. Prosecutions based upon six substandard samples (total citric acid content of 350-cc. bottles being 29.75, 30.5, 30.5, 31.0, 31.0 and 31.0 Gm., respectively) were instituted and the defense put up a vigorous fight based upon:

(*a*) Value of the "assay" in general.

(*b*) Possible blunders in manipulations of the chemist.

(*c*) Possibility of deterioration between the time the samples were purchased and the time the chemist began the actual assay (some three days interval having elapsed between time of purchase and beginning of assay).

(*d*) Difficulty in establishing the variable factor "dull red heat."

All of these points were successfully met by the two chemists appearing for the State and a verdict of "guilty" was brought in by the jury. It is true the "guilty" verdict was applied only to the three lowest samples while "acquittal" was registered for the three 31-Gm. samples but the split verdict represented a question of equity and the outcome of the trial was a complete victory for the "assay" itself.

As mentioned in the beginning of this paper the citric acid "assay" should at its best be considered as a test for limits of free and total acidity. As to "free acidity" our experience is that standard set (10 cc. of the official solution should require not less than 9.5 cc. of $N/2$ NaOH) is a trifle severe. The extremely broad standard set for magnesium carbonate (not less than 39.2 per cent of MgO) plus the fact that much of the pharmacopœial carbonate runs considerably over 40 per cent is reflected in the high MgO content of samples of solution of magnesium citrate. Thus results shown in Table III

MgO Content of the Carbonate.	MgO Content of the Citrate Solution (per 100 cc.).	
40.8%	1.88	1.88
39.9%	1.81	1.85

indicate not only that the 1.50 Gm. MgO content per 100 cc. is markedly low but furthermore that when a carbonate of high MgO content is employed the degree of free acidity will fall, at times below the U. S. P. limit.

We therefore recommend that in the monograph in U. S. P. XI the words "minimum of acidity" be omitted and that the test stands as indicating "minimum of total citric acid" only.

Dr. Joseph L. Mayer, deviser of the original "assay," has publicly protested against certain pharmacopœial modifications, which he claims lessen the value of the test. In Dr. Mayer's main objection, the present writers concur. The wording of the "assay" on page 219 of U. S. P. X provides for the evaporation and ashing of the neutralized fluid and then states "proceed as directed under the assay for alkali salts of organic acids, page 431." Reference to page 431 shows that the residue is to be treated with water and then titrated with $N/2$ H_2SO_4, using methyl orange as indicator. Dr. Mayer's original procedure was to dissolve this residue in an excess quantity of $N/2$ H_2SO_4 and then titrate the fluid (after removal of CO_2 by boiling) with $N/2$ NaOH, using phenolphthalein as indicator. We agree with Dr. Mayer that his procedure is better than that of the Pharmacopœia; we actually follow this more accurate procedure in our routine analyses of this pharmaceutical; and we hope that the next Revision Committee will direct this vastly superior "residual titration" method for the direct titration now provided.

There has been much (and just) criticism of the action of the U. S. P. Revision Committee in increasing the amount of citric acid in Solution of Magnesium Citrate from the 33 Gm. per 350 cc. standard provided in U. S. P. IX to the 35 Gm. standard of U. S. P. X. While this phase of the magnesia situation is beyond

the limits of this paper, we have no hesitation in saying that as yet no explanation from advocates of the change have appeared valid to us. The argument most frequently stressed, the argument that the addition of another two grams of citric acid prevents precipitation, is, in our opinion, based upon faulty reasoning. The true solution of the precipitation problem is solved by two factors: (*a*) complete sterilization of the finished solution (including bottles and stoppers) and (*b*) proper sealing of the bottle. We therefore express the hope that the next Revision Committee will direct the lessening of the citric acid content of the solution to 33 Gm. per 350 cc.

CONCLUSIONS.

1. The test for limit of total acid in Solution of Magnesium Citrate has stood the scrutiny of hundreds of analyses and has withstood the fires of the rigidly critical cross examination of litigation.

2. That part of the test relating to "minimum of acidity" is somewhat too severe, is unnecessary and should not be mentioned in the monograph of U. S. P. XI.

3. Statements as to the rapid loss of citric acid by decomposition after the bottle is opened are not borne out by data given in this paper.

4. The pharmacopœial requirement as to ashing *at dull red heat* should be observed. However, heating to white heat for one-half hour does not seriously affect the "assay."

5. The alkalinity of the resultant ash should be determined by residual titration rather than by the direct titration method given on page 431 of U. S. P. X.

6. It is our opinion that the increase of the citric acid content of the 350-cc. bottle of Solution of Magnesium Citrate from the 33 Gm. of U. S. P. IX to the 35 Gm. of U. S. P. X was inadvisable and unnecessary.

ACKNOWLEDGMENTS.

Our thanks are due to our assistants (1917–1929), H. J. Goeckel, Elizabeth Kish Schaefer, C. H. Soren and Harry Koslowsky, for their valuable aid in obtaining much of the analytical data upon which this paper is based.

COLLEGE OF PHARMACY, COLUMBIA UNIVERSITY,
April 30, 1930.

EXPERIMENTAL INVESTIGATIONS CONCERNING THE STANDARDIZATION AND THE PHARMACOLOGY OF HEART TONICS.*

(With a New Assay Method.)

BY WILLIAM NYIRI, M.D., AND LOUIS DUBOIS.

During the last two years we have carried out research work on heart tonics at the Rutgers College of Pharmacy in Newark, N. J., and we take the liberty to report, briefly, on the results of our investigations, giving you the principal points

* Scientific Session, A. PH. A., Baltimore, Md., 1930.

of our findings. The shortness of time prevents us from giving proof of our statements; however, we hope that the discussion will give us the opportunity to go into some details.

Our work may be subdivided into two parts:

I. Standardization of Heart Tonics.

II. Pharmacology of Digitalis, with special reference to the relationships of calcium- and hydrogen-ions to digitalis.

Fifty cats, more than 300 rabbits and nearly 4500 frogs have been used for these experiments.

I.

We studied each important factor of digitalis standardization separately and came to the following conclusions:

A. Warm-blooded animals are to be preferred as test material to animals lower in the animal scale, and to plants. In particular, we studied the variation obtained in the results with the use of the frog as test animal. We successfully carried out the U. S. P. frog assay, the timeless method, the intravenous method, and made experiments with the isolated heart on the cannula by Straub. The individual variation of these experiments was very high and showed the same range even when working on the Straub heart. We conclude from these experiments that this variation is inherent to the frog heart itself.

B. With our present knowledge of the response of living test material to the action of digitalis, the number of animals necessary for a single determination should be left to the judgment of the individual worker and dependent upon his experience. Biometric methods, in general, should be used with the utmost care to answer the above question. The formula of Van Wijngaarden, which at present is generally accepted and endorsed by the Hygiene Committee of the League of Nations, allows too wide a range of variation and does not fulfil the purpose for which it has been recommended.

C. The best way of administering heart tonics in the assay is the intravenous injection.

D. The new intravenous anesthesia is to be preferred over the former methods of narcosis in animal experimentation, in general, for the standardization of heart tonics in particular.

E. The drop of the blood pressure to zero, as shown by the kymographic tracing, approaches closest the theoretically expected end-point of the experiment and thus is to be preferred to the observation of the stoppage of the heart and the general death of the animal.

F. The time of the individual experiment should be kept as uniform as possible. In view of our newer knowledge of the distribution of digitalis in the body and with reference to the differences in the pharmacological action of the various active constituents of the heart tonics, this is one of the criteria of a successful assay. Considerable differences as to beginning and duration of the action of these constituents on the heart make this precaution necessary.

G. One of the main handicaps of the different methods of digitalis standardization in use at present is the fact that both tinctures and infusions need preparation prior to the test. These procedures, as evaporation of alcohol or water and

great dilution of the alcoholic solution throws out active constituents thus damaging the strength of the preparation to be tested. The basic requirement for a practical assay method, the purpose of which is to give information about the quantitative action of digitalis preparations, should avoid any such damaging manipulation.

H. Based on the study of these principal factors, we worked out a practical method of digitalis standardization using the rabbit as test animal. This method has the following advantages: The animal material is always easily available. The end-point of the assay obtained by means of the drop of the blood pressure, supplementing the test by the use of ouabain, is definite and as close to the theoretical end-point as may possibly be expected. Rabbits have a higher resistance to heart tonics than other warm-blooded animals. Tinctures, therefore, need only be diluted one to four, which does not interfere with the test. The method allows the testing of drugs of high concentration as well as drugs of great dilution without preliminary damaging manipulations of the heart tonics.

II.

The results of our experiments concerning the relationships of calcium- and hydrogen-ions to digitalis may be briefly summarized as follows:

A. Full digitalis and strophanthine poisoning of the heart with all eventual toxic stages takes place even in the absence of calcium ions.

B. Increased Ca^{++}-concentration to at least four to five times the normal reinforces and hastens the action of digitalis.

C. The acid-base equilibrium of the nutrient fluid of the heart can be changed within the range of a p_H of 5.2 to 7.6 without visible damage to the heart action. The heart takes up the excess of H^+ or OH^- ions within the above range within a very short time, thus reëstablishing the physiological balance.

D. Full digitalis action occurs with changes of the p_H within the above-mentioned range.

E. Typical digitalis poisoning also takes place when the heart works under the combined influence of calcium and atropine as well as of calcium and adrenaline.

The experiments show that the toxic action of digitalis and strophanthine on the heart is *sui generis* and independent within reasonable limits from changes in the concentration of the surrounding ions. The reinforcing effect of calcium on digitalis encourages their combined therapeutic use.

ABSTRACT OF DISCUSSION.

James C. Munch stated that he was very much interested in this work; that he had been collecting various methods of standardization and for Digitalis he had thirty-eight bio-assay methods. He stated that the method presented had not been previously reported in literature and therefore it may be called a new method, and inquired relative to the lethal dose of ouabain to the rabbit and whether the dose was reasonably consistent throughout the year.

The author replied that the lethal dose is about twice as high to rabbits as to cats; instead of 100 mg. it is around 190 mg. per kilo.

James C. Munch further inquired whether part of the digitalis was first given and then ouabain. The author stated that the test required about 30 or 40 minutes. There was a waiting period of about twenty minutes before administering ouabain.

The results of these investigations, which have been made possible by a research grant of Merck & Co., Inc., Rahway, New Jersey, appear in a series of four publications in the *Journal of Pharmacology and Experimental Therapeutics.*

ADULTERATED GINGER—RESPONSIBLE FOR RECENT PARALYSIS EPIDEMIC.

BY PETER VALAER.

The story of the rise and fall of alleged Fluidextract of Ginger or "Jake" is an old, old story not created by Prohibition but was a problem many years before the advent of the Volstead Act. However, a new and dreadful chapter is written with the appearance of poison ginger or phenol-containing ginger which began to be distributed early in February 1930, and reached its high tide during March, slowly receding toward the end of June, leaving in its wake more than 16,000 victims—some slightly paralyzed in hands and feet, many more seriously paralyzed to the extent of total paralysis, and some, possibly ten victims, have died while being paralyzed. Many theories have been advanced and abandoned as to the cause of the paralysis.

It is clear to those who have carefully studied the investigation that there is no one holding a permit to withdraw denatured or non-beverage (pure) alcohol involved in this gigantic plot to manufacture, distribute and sell this adulterated, substandard and beverage ginger. While hundreds of distributors and sellers have been apprehended and action taken against them, to date the actual manufacturers of phenol gingers have not been found.

To briefly outline the kinds of ginger found on the market it may be said that before the appearance of the phenol ginger the most common form of adulteration was the use of castor oil, the formula being very simple. Enough ginger, usually in the form of oleoresin of ginger (which is usually the alcohol or acetone soluble material extracted from the ground root of either Jamaica, African, Cochin, Japanese or other kinds of crude ground ginger), was added to give it a ginger character which usually amounted to tincture of ginger, sometimes stronger than but usually weaker than tincture preparations. This base when analyzed would show only about .5% solids; the other 3.5% of solids are added in the form of tasteless castor oil. The U. S. P. Fluidextract of Ginger, the only preparation which can be sold unrestricted as a standard medicinal preparation and which is unfit for beverage purposes, contains not less than 4% solids (oleoresin) extracted from the ginger root. This U. S. P. preparation is nearly black in color and exceedingly pungent in taste and entirely unfit for beverage purposes.

In the past twenty odd years, there has been found ginger adulterated with castor oil, molasses, glycerin, herb extract, sugar, mineral oil, glycols and other substances.

Geographically, the field of the paralysis ginger has been investigated and wherever the phenol ginger has been found there have been paralysis victims; in regions where there was plenty of adulterated ginger but no phenol gingers there has been not one case of paralysis. Overwhelmingly the evidence shows that it is the phenol ginger that is responsible. Very reluctantly have many been forced to admit this, principally because the textbooks did not list the phenol ester as a poison. Testimony of innumerable witnesses afflicted with this "jakitis" have agreed that this ginger preparation and ginger alone is responsible. All samples with case history, and there are many, show heavy phenol- or cresol-like bodies. This alleged Fluidextract of Ginger causing the paralysis did not contain any trace of

denaturant used in completely or specially denatured alcohol. It does not contain mineral poisons, lead, arsenic or alkaloidal poisons. This adulterated ginger is the mildest of all beverage gingers in outward character, having a pleasant molasses-like odor, which is due to the crude rosin oil found in all of it along with this tri-(*O*)-cresyl phosphates and di-ethylene glycol. The color is due to a dressing of real ginger, given it from Fluidextract of Ginger or from oleoresin of ginger (the non-volatile solids material of true Fluidextract of Ginger), to which it owes its character, the pleasant aromatic pungency of ginger.

Those not familiar with the esters of phenol or cresylic bodies combined with phosphates think of them as unpleasant substances, like carbolic acid or lysol, but this is not the case because obviously no such substance could be used, as the material added in place of most of the ginger must be as pleasant and as tasteless as possible so as not to interfere with the true ginger character, the purpose being to render it less pungent and fit for beverage purposes. From a beverage standpoint crude rosin oil and tri-cresyl phosphate both are quite unobjectionable as an adulterant, the former imparting a slight characteristic on its own account and the tri-cresyl phosphate being almost tasteless and odorless could affect its taste but little.

The result of the addition of these adulterants is a very cheap ginger, the tri-cresyl phosphate selling at about 30 cents a pint and the rosin oil selling at about 30 cents a gallon.

It was this cheap, grossly adulterated ginger, carrying the paralysis producing portion, which during these fatal months undersold, particularly the castor oil ginger and other adulterated gingers and played havoc through the Carolinas, Georgia, Tennessee, Mississippi, Alabama, Texas, Kansas, Ohio and Oklahoma, as well as other states. Tri-ortho-cresyl phosphate and rosin oil are ideal substitutes for oleoresin of ginger being soluble in alcohol and quite miscible with the true oleoresin that must be added if it is to be sold as Fluidextract of Ginger.

No one who has ever seen U. S. P. Fluidextract of Ginger, even once, or has touched a drop of the same to his tongue would ever again be confused between it and adulterated ginger, already described here—one of the principal differences being the color, the adulterated article being quite light, read about 4 in the $^1/_{16}$" cell of a Lovibond tintometer, while the true U. S. P. Fluidextract of Ginger would never read less than 19 and the average being 22, the difference in the taste of the article being even more pronounced—the volatile oil in true Fluidextract of Ginger being not less than 1%, the adulterated article showing usually less than $^1/_{10}$ of this amount. There are numerous other points of difference, not necessary to mention here.

Experiments conducted to determine the action of cresyl-bearing ginger on animals showed that a picture of phenol poisoning is obtained which is followed by paralysis in the legs of animals. This can be reproduced with fair consistency, using for these experiments monkeys, rabbits and chickens. Alcohol, U. S. P. Fluidextract of Ginger and adulterated fluidextract containing castor oil or other ordinary adulterants used to make solids do not produce these symptoms. (See Public Health Report, Vol. 45, 330, July 25, 1930.)

It is believed that paralysis producing tri-ortho-cresyl phosphate was added without knowledge of its dangerous character. It has been reported that very few

patients afflicted with ginger paralysis are improving. For a time it was generally supposed that they were actually growing worse. In some slight cases recovery has been effected. It may be that in time all the cases may recover but the mending of the affected nerve tissue is slow. Some monkeys once well paralyzed with ginger have almost completely recovered.

Many methods of treatments have been used—none having been particularly effective. Electric treatments, hot baths, remedies such as strychnine, nux vomica, sodium thiosulphate, iodine, all have been used. Many useless quack remedies have been brought forth.

It would seem that distributors and wholesalers have responsibilities for the character of goods they handle. The retailer knows full well if his customers consume it for beverage purposes, but what seems more reprehensible than all is the druggist retailer who will procure his Fluidextract of Ergot, Cascara and other standard drugs from reliable drug houses and then purchase Fluidextract of Ginger, which is pale in color, thin in body and with only a suggestion of ginger, from an unknown distributor or manufacturer.

It has required months of untiring effort on the part of the pharmacologists of the Hygienic Laboratory and the Bureau of Industrial Alcohol Chemists to determine the true cause of the paralysis epidemic, and many animals had to be sacrificed for this purpose. It required more than 20 gallons of the adulterated ginger to positively prove the presence of the tri-ortho-cresyl phosphate.

This ginger was found to be adulterated with about 2% of tri-ortho-cresyl phosphate, about 1% di-ethylene glycol, some rosin oil, a small amount of unidentified impurities and a small dressing of genuine ginger resins about .5% from which it gets its general ginger character.

It is the tri-ortho-cresyl esters that are responsible for the paralysis epidemic. Paralysis can be produced by this chemical when chemically pure or in a commercial state of purity or when it is used as an adulterant of Fluidextract of Ginger.

This opens a new field in pharmacology, the study of the action of the phenol esters in the human body.

Most of the chemical work in this investigation was done by Mr. George E. Mallory and Mr. W. H. Frazier of the Bureau of Industrial Alcohol in the Treasury.

This splendid piece of pharmacological work was done by and under the direction of Maurice I. Smith, M.D., National Institute of Health (Hygienic Laboratory).

See Vol. 45, 330, July 25, 1930. "Public Health Report."

NOTE: There will be published in the *Public Health Report* the complete and finished data on the action of tri-ortho-cresyl phosphate which will finish the experiment in the relation to paralytic ginger. There will also be issued an extensive mimeograph by the Bureau of Industrial alcohol covering all the chemical work involved in the analysis and isolation of tri-ortho cresyl phosphate and other ingredients found in the adulterated ginger. Both of these publications will be available on application to the Bureau of Industrial Alcohol, Washington, D. C.

A COMPARISON OF THE p_H OF NEOARSPHENAMINE AND SULPHARSPHENAMINE IN RELATION TO DIFFERENCES IN THEIR STRUCTURE.*

BY A. E. JURIST AND W. G. CHRISTIANSEN.

In a previous publication (1) the p_H of neoarsphenamine was reported to vary from 5.8 to 8.7 and now some results of p_H determinations on sulpharsphenamine will be given showing a variation from 2.4 to 4.4 in market samples. The wide differences in the p_H ranges of these two arsenicals is of great significance in considering their structures; it has been found that neoarsphenamine is not stable in the p_H range of sulpharsphenamine and that the latter is less stable in the p_H range of neoarsphenamine than in the p_H range 2.2 to 4.4.

The p_H of sulpharsphenamine was determined in the shaking electrode vessel described by Clark (2) using a platinum wire electrode, first gold plated and then paladinized, and 10% solutions of the arsenical. As in the case of neoarsphenamine the highest voltage registered was taken as the final reading, and, except for occasional cases of electrode poisoning, a constant voltage was usually obtained for a sufficiently long period of time to give reliable results. The following table gives the results of the examination of some market and experimental samples. The pure sulpharsphenamine acid was obtained by precipitating the acid from a concentrated aqueous solution of sulpharsphenamine with an excess of glacial acetic acid. The finely divided precipitate was collected on a Büchner funnel, washed free of acetic acid with alcohol, then washed with ether and dried *in vacuo* over P_2O_5. The acid is quite stable and does not decompose as readily as does the so-called neoarsphenamine acid.

TABLE I.—RESULTS OF p_H DETERMINATIONS ON SULPHARSPHENAMINES.

Number.	Nature of sample.	p_H of 10% solution.	Number.	Nature of sample.	p_H of 10% solution.
1	Market	2.44	6	Experimental	2.38
2	Market	2.52	7	Experimental	2.64
3	Market	2.52	8	Experimental	3.45
4	Market	3.49	9	Experimental	3.57
5	Market	4.36	10	Sulpharsphenamine acid	2.15

The results show a p_H range of 2.15 for the acid to a p_H of 4.36 for one market sample. These results indicate that sulpharsphenamine contains a certain amount of free acid which is not the case in neoarsphenamine. Although this acid is not a weak one, it is not quite as strong as acetic acid by which it is precipitated. Sulpharsphenamine shows the same phenomenon of increased p_H on dilution that was previously reported for neoarsphenamine; only a few determinations were made to demonstrate this fact—the p_H in dilute solutions was not usually run on sulpharsphenamine.

In order to prove the presence of free acid in sulpharsphenamine several samples of sulpharsphenamine were ashed in excess sulphuric acid to determine the sodium as sodium sulfate after all of the arsenic had been burned off. The results of the sodium, sulphur and arsenic determinations are given in the following table. Sulfur was determined by the method described by Elvove (3) for total sulphur and arsenic was determined by the Lehmann method.

* Scientific Section, A. PH. A., Baltimore meeting, 1930.

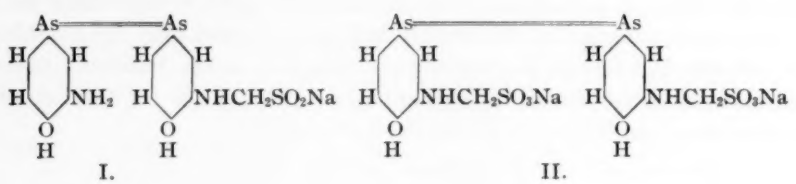
TABLE II.—ANALYSIS OF SULPHARSPHENAMINES FOR SULPHUR, ARSENIC AND SODIUM.

Number.	Sample A.	Sample B.	Sample C.
p_H	2.50	4.36	3.49
Per cent arsenic	20.28	21.30	21.52
Per cent sulphur	12.39	11.31	11.91
Per cent sodium	6.59	7.51	7.49
Atoms of arsenic	2	2	2
Atoms of sulphur	2.86	2.50	2.60
Atoms of sodium	2.00	2.30	2.27

These results show a preponderance of sulphur on an atomic ratio basis and, since the sulphur must be present either as sodium formaldehydebisulphite or sulpharsphenamine because any free sulphur dioxide would have been lost in the preparation of sulpharsphenamine, it must be concluded that the excess sulphur is present as sulpharsphenamine acid thus accounting for the results of the p_H determinations. Also it is noteworthy that the p_H rises as the atomic ratios of sulphur and sodium approach each other. It is apparent that the lowest p_H is found in Sample A where the difference between these two atomic ratios is greatest and highest in Sample B where the difference between these two ratios is smallest.

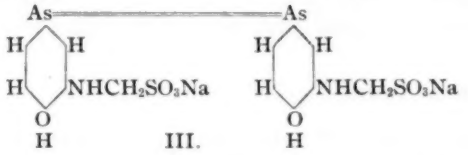
From the foregoing information the question arises as to how two compounds of supposedly so little structural difference can be so widely different in their p_H ranges and in their stability at different p_H ranges; neoarsphenamine is decomposed in the acid p_H range of sulpharsphenamine and sulpharsphenamine becomes less stable when alkalinized up to the p_H range of neoarsphenamine. The only possible conclusion is that there is a fundamental difference in the structures of these two arsenicals. This possibility has been suggested by Newbery and Phillips (4) who pointed out that whereas sulpharsphenamine is prepared by the separate and successive action of formaldehyde and sodium bisulfite on an aqueous solution of arsphenamine hydrochloride (5, 6), sodium formaldehydebisulphite reacts with arsphenamine hydrochloride to yield an altogether different compound. This finding has been confirmed in this laboratory. Furthermore, they pointed out that whereas the sulfur attached to the amino group in sulpharsphenamine could not be oxidized by alkaline iodine, the sulphur attached to the amino group in the compound obtained with sodium formaldehydebisulphite could be oxidized by alkaline iodine solution. Additional work by Newbery and Phillips on aminophenols showed that only the latter type of compound could be obtained from para and meta amino phenols and that the sulpharsphenamine type of compound could be obtained only with ortho-aminophenols, *i. e.*, the classification in which arsphenamine belongs. This latter observation gives a point of attack from which a new structure for sulpharsphenamine may be derived.

The hitherto accepted structures of neoarsphenamine (I) and sulpharsphenamine (II) are given as follows:

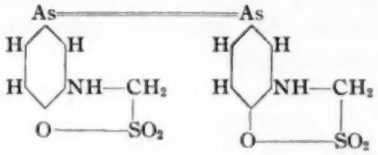


I. II.

If these two structures are compared no difference is noted except the degree of substitution and the presence of one more oxygen atom in the side chain attached to the amino group in sulpharsphenamine. These differences are insufficient to account for the wide difference in the p_H ranges of neoarsphenamine and sulpharsphenamine, the great stability of sulpharsphenamine acid as compared to the instability of neoarsphenamine in acid solution and the difference in the reaction of the sulphur in these two compounds when treated with alkaline iodine solution. However, if the presence of the hydroxyl group in the ortho position to the amino group is taken into consideration a possible structure for sulpharsphenamine can be developed. The structure suggested represents a ring formed by splitting off water between the methylenesulphurous acid group and the orthohydroxyl group to give the structures shown in which III represents the sodium salt and IV the stable free acid.



III.



While no positive evidence of this structure is available no other explanation of the stability of this acid as compared to the instability of neoarsphenamine acid is apparent. A ring structure of Type IV would account for the stability of this material in acid solution, the failure of alkaline iodine to oxidize the sulphur and also the decreased stability in alkaline solution; the alkali would break the ring, form a sodium salt on the methylenebisulphite side chain and result in a compound of the type of structure III which is very similar to neoarsphenamine both in structure and susceptibility to oxidation. The great similarity between the two types of sodium salts is clearly shown by Formulas I and II.

The experiments discussed here show very clearly that there is a considerable structural difference between neoarsphenamine and sulpharsphenamine, the p_H determinations and sodium analyses demonstrating clearly the acid nature of sulpharsphenamine as compared with the alkaline character of neoarsphenamine. It is shown further that sulpharsphenamine is stable at a p_H at which neoarsphenamine would be decomposed. In order to account for these differences a new structure for sulpharsphenamine is suggested involving a ring formation between the phenol group and the sulphurous acid portion of the side chain by splitting off water. It is pointed out that this ring type of structure would account for the three major chemical differences between neoarsphenamine and sulpharsphenamine discussed here and would also account for the greater stability of sulpharsphenamine as compared to neoarsphenamine. The p_H of sulpharsphenamine has been found to range from 2.4 to 4.4.

(1) Smith, Jurist and Christiansen, JOUR. A. PH. A., 18 (1929), 1142.
(2) Clark, "The Determination of Hydrogen Ions," Third Edition (1928), 295.
(3) Elvove, U. S. P. H. S. Reports," June 12, 1925; 40, No. 24, page 1235.
(4) Newbery and Phillips, *J. Chem. Soc.* (1928), 116.
(5) Voegtlin and Johnson, *J. Am. Chem. Soc.*, 44 (1922), 2573.
(6) Christiansen, *Ibid.*, 45 (1923), 2182.

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STUDIES ON STRYCHNINE.

1. The Relative Sensitivity of Certain Chemical and Physiological Tests.

BY JUSTUS C. WARD* AND JAMES C. MUNCH.[1]

As the result of an intensive study of the efficiency of various substances in the control of predatory animals and rodents a great deal of attention has been directed to the use of strychnine alkaloid and its salts. A large number of mixtures have been prepared containing various proportions of strychnine in combination with acids, alkalies, sugars, oils, proteins and albumins. The results obtained by investigators of the Bureau of Biological Survey since its inception in 1905 have been consolidated in this series of papers. In this communication the relative sensitivity of a number of chemical tests is reported, as well as experiments to determine the minimum concentrations possessing just detectable bitterness to the human taste.

CHEMICAL TESTS.

A search of the literature failed to reveal any extensive investigation of the relative sensitivity of the various chemical tests which have been reported from time to time (1, 2, 4, 10).

A number of samples of commercial strychnine alkaloid, sulphate and hydrochloride obtained on the open market were analyzed quantitatively by the method outlined in U. S. P. X (11) and found to contain ninety-nine per cent or more of the estimated amount of free alkaloid. Brucine was not detected in any sample. In making tests upon the solid material a small amount was placed upon a porcelain crucible cover and the liquid reagents added drop-wise. In testing liquids, freshly prepared solutions were used. The developments of various colors were noted over a period of ten to fifteen minutes. The technic employed in the chemical tests is as follows:

A. Potassium Dichromate: One drop of a solution (0.05 cc.) of known concentration was measured from a 1-cc. Mohr pipette. In other tests, one cc. of a solution of known concentration was carefully evaporated to dryness in a drying oven at 50° C. Two drops of concentrated sulphuric acid were then added and stirred with a glass rod until solution was complete. A minute crystal of potassium dichromate was placed *near* the solution and streaked through it by a fine-tipped glass rod. A test was not considered positive unless the entire play of colors (violet, purple, blue, reddish brown and finally green) was obtained.

B. Lead Dioxide: The same technic was used as in *A*. Powdered lead oxide was used. The same play of colors was obtained except that the purple and blue were less vivid because of the masking effect of the lead oxide.

C. Potassium Permanganate: The same technic was used as in *A*. The purple and blue colors were overly intensified. Some degree of color was always developed from the interaction of the reagents employed. Accordingly the authors feel this test is not sufficiently distinct to be of much service.

D. Manganese Dioxide: The same technic was employed and the same difficulties developed as in *C*, due to the black color caused by the oxidizing agent.

E. Mandelin's reagent: (One per cent ammonium metavanadate in concentrated sulphuric acid.) The reagent was always freshly prepared. The sequence of development of colors

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was identical with *A*. The violet color lasted much longer than with potassium dichromate, but the other colors were less persistent.

F. Potassium Iodate: The same technic was used and an identical play of colors observed as in *A*. However, the test was the least sensitive of those employing oxidizing agents in sulphuric acid.

G. Malaquin's reagent (6): To one cc. of solution, two cc. of dilute hydrochloric acid and approximately 0.2 Gm. of granular zinc were added. After standing one minute the mixture was rapidly brought to a boil, cooled and carefully stratified on two cc. of concentrated sulphuric acid. With concentrated solutions of strychnine a rose ring developed immediately at the juncture of the two layers; with dilute solutions an interval of five to ten minutes was usually required. This color diffused throughout the solution on standing. Buc[1] has published a modification of this test with the claim that it will detect 1 microgram of strychnine; this has not been confirmed by the authors.

The results obtained in testing a series of solutions of gradually decreasing concentration are given in Table I.

TABLE I.—CHEMICAL TESTS FOR STRYCHNINE.

Reagents used.	Threshold detected micrograms.
1. Sulphuric Acid + Potassium Dichromate	1.0
2. Sulphuric Acid + Lead Dioxide	1.7
3. Sulphuric Acid + Potassium Permanganate	1.7
4. Sulphuric Acid + Manganese Dioxide	1.7
5. Mandelin's Reagent	1.7
6. Potassium Iodate	5.0
7. Malaquin's Test	6.7

It is evident that the potassium dichromate test is the most delicate, serving to detect 1 microgram (0.001 milligram) of strychnine. Tests *B*, *C*, *D* and *E* were equally sensitive, having a threshold at 1.7 micrograms. The test F had a threshold at 5 micrograms. The test *G* was the least sensitive, having a threshold at 6.7 micrograms. For quantitative purposes it is concluded that tests with potassium dichromate when properly conducted are the most useful and will serve to detect one microgram of the alkaloid.

PHYSIOLOGICAL TESTS.

For the physiological determination of strychnine, several methods have been suggested in the literature. The most sensitive was that developed by Newman (5, 9, 12) and extensively employed in studying the elimination of strychnine. Strychnine solution injected into the ventral lymph sac of frogs produced perceptible convulsions (5, 12). The very small amount of one microgram of strychnine was determined quantitatively by intra-spinal injection into frogs. Falck (3) demonstrated the presence of 2 micrograms of strychnine by the effect upon immature mice. Tests have also been made upon plants, crabs, rats, cats, dogs and other animals (8). A comparative study of the detection and determination of strychnine using animals will be reported subsequently.

In this comparative study, the technic developed for the bio-assay of capsicum was used (7). Stock solutions of strychnine base and of its salts were prepared containing one part of strychnine alkaloid in ten thousand parts of distilled water (1 cc. contains 100 micrograms). Solutions were prepared for taste tests by dilut-

[1] *J. A. O. A. C.*, 3 (1919), 193.

ing measured volumes of the stock solution immediately before use. Five cc. of the test solution were retained in the mouth for exactly one minute, being flooded back and forth over the taste buds, then ejected. Great variation was noted in the time interval until bitterness was evident. In some instances bitterness was detected first at the tip of the tongue, in others on the sides or base. In some individuals a response was obtained within five seconds even with the threshold dilutions; in others an interval as long as one minute was required. For the sake of accuracy a recovery period of at least thirty minutes elapsed between tests on the same individual. The results obtained are reported in Table II.

TABLE II.—THRESHOLD TASTE LIMEN OF HUMANS FOR STRYCHNINE.

Results in Micrograms of Alkaloid.

Solvent.	Strychnine in Form of: Alkaloid.	Sulphate.	Hydrochloride.
Distilled Water	5.6	5.4	5.8
City Water	6.1	6.4	6.3
Sodium Chloride—0.6%	7.1	7.0	8.5
Sodium Chloride—0.9%	7.2	7.2	9.5
Sucrose—1%	8.9	7.2	7.2
Sucrose—5%	11.1	8.5	9.5
Sucrose—10%	17.5	14.8	14.3

Detailed study of the various thresholds show that it is possible to mask the bitter taste of strychnine by a number of products. In general a solution of strychnine in the form of the alkaloid was less bitter than in the form of the salt. This may be due to a slower rate of solution of strychnine within the cells of the taste buds around the terminations of the glosso-pharyngeal nerve. Solutions were less bitter in tap water than in distilled water, and a progressive decrease in apparent bitterness was noted in 0.6 per cent and 0.9 per cent sodium chloride, respectively. With the alkaloid and the sulphate, dilutions in 1 per cent sucrose gave a greater masking effect than 0.9 per cent sodium chloride. The sulphate gave practically the same bitterness and the hydrochloride was more bitter. Increasing the concentration of sucrose to 5 per cent and 10 per cent progressively decreased the apparent bitterness.

TABLE III.—INDIVIDUAL VARIATION IN THRESHOLD TASTE LIMEN OF FIVE HUMANS TO STRYCHNINE.

Solvent.	Strychnine as alkaloid: Individual No. 1.	2.	3.	4.	5.	Average.	Strychnine as sulphate: Individual No. 1.	2.	3.	4.	5.	Average.
Distilled Water	5.5	5.0	6.3	6.3	5.0	5.6	5.0	6.3	...	5.0	5.5	5.4
City Water	5.5	5.5	6.3	7.2	6.3	6.1	6.3	6.3	...	7.2	6.3	6.5
Sodium Chloride—0.6%	6.7	6.7	....	7.7	7.2	7.1	6.7	6.3	7.7	6.7	7.7	7.0
Sodium Chloride—0.9%	7.5	7.2	....	7.2	7.2	7.2	6.7	....	7.7	6.7	7.7	7.2
Sucrose—1%	7.7	8.3	10.0	10.0	8.5	8.9	7.2	7.2	...	7.2	7.2	7.2
Sucrose—5%	10.0	10.0	10.0	11,1	14.3	11.1	8.3	8.3	...	9.1	8.3	8.5
Sucrose—10%	16.7	14.3	16.7	20.0	20.0	17.5	14.3	14.3	...	14.3	16.7	14.7

The agreement of thresholds of five humans, tasting the same dilutions at the same time, are shown in Table III. In general, results of tests by the same individual agreed within 5 per cent.

CONCLUSIONS.

1. Chemical tests for the qualitative and quantitative determination of strychnine have shown that potassium dichromate–sulphuric acid is the most

sensitive, giving a positive reaction with a quantity of one microgram (0.001 milligram).

2. The average limit of perceptibility of bitterness of strychnine dissolved in distilled water to human taste was found to be five micrograms.

3. The addition of sodium chloride, or sucrose, decreased the apparent bitterness.

4. Marked differences in reaction time and place of detection on the tongue have been found in different individuals.

5. When each individual is standardized, it is possible to detect differences of five per cent without trouble.

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FOOD AS A PREVENTIVE MEDICINE.*

BY EDSEL A. RUDDIMAN.

Good health is the most important thing in life to have. Food largely influences good health. Therefore, food is the thing above all others which should receive our attention.

I have a little hesitancy in saying anything on the subject of food, because so much has been said and written; and yet in a way we have been more careless in this one thing than in anything else that we do. Of course if we all had perfect health there would be no need of pharmacy, but there is not one of us that would not gladly seek some other calling if that time should ever come.

Doctor Scoville (1), in an article entitled "Pharmacy, a Review and a Forecast," says: "The presence of the lunch counter in the drug store, which the old-time pharmacist views with misgivings, may be a real step in advance." I quite agree with him provided the pharmacist puts over the idea of what are the proper

* Scientific Section, A. PH. A., Rapid City meeting, 1929.

things for him to eat. The use of drugs is quite dependent on the misuse of food.

The subject of what to eat is being studied by scientists and to some extent by the laity as it has never been studied before. The people in general want to know more of the details as to how they can get a better balanced and a complete diet. Some of the information which they accept is not always reliable. As for example: Because of certain advertising many persons think that raisins contain a large amount of iron. Analysis shows that many common foods are much richer in iron. Egg-yolk contains four times as much as raisins; beans three and a half times; whole wheat two and a half times; fresh spinach, prunes, dates, one and a half times. People not knowing better believe such advertising; reasoning, because it is in print it must be true.

Improper food has much to do in causing disease both directly and indirectly. An industrial firm recently kept a record of the number of hours lost by its employees for a given period and the causes of the absences. The conclusion arrived at was that over 80 per cent of the hours lost was due to stomach troubles. This means not only a loss to the employees but a greater loss to the employer because of the goods turned out and expensive machinery lying idle. Indirectly, improper food may result in a failure to build up a healthy resistance which perfect health requires; it may cause conditions which render the person more susceptible to disease. It may even be a factor in the production of criminal tendencies. We may eat a heavy meal at a banquet late at night and the next day know that we have done wrong, but each day we may eat a little too much or too little or not the right combination and not know that we have been indiscreet. One of the curses of the present day is eating too much. Of course food is not the only thing necessary for good health. Good air, sunshine, exercise, sleep and moderation in everything are essential.

Undoubtedly proper food contributes much to longevity—it cannot be otherwise; experiments made with animals prove it, although Dr. Pearl (2) of Baltimore after investigating fifty-one cases of persons who had lived to be ninety years old or over concludes that heredity is the greater factor.

If we could know and would eat the right amount of food and the right kind of food best suited for the age, work, sex, climate and conditions in general, there would be less disease and there would be greater efficiency both physically and mentally. In a recent number of the *Parents Magazine* is an article on "Intelligence Is Affected by Food" by Dr. Munroe (3). Among other experiments he reports one in which ten children were selected from average families, every girl having a sister and every boy a brother who were used as controls. Those selected were given a chocolate egg milk shake twice a day for seven months, in addition to the regular food which the controls had. Those who had received the milk shake gained in weight and in intelligence over the controls. The writer continues, "Many children are starved both before and after birth into habits of metabolism which would throttle the growth of an elephant, to say nothing of the delicate structures of the nervous system of the human being."

There are seven essential constituents of foods: (1) Proteins; (2) Fats; (3) Carbohydrates; (4) Mineral salts; (5) Vitamins; (6) Roughage; (7) Acid- and alkaline-producing ingredients. If any one of these constituents is lacking

disease results. Many foods contain some of all of these, but so far as known not a single food contains them in proper proportion to promote growth and maintain life for any length of time.

Numerous surveys have been made of food eaten by different classes of persons in different vocations. The amounts of proteins, fats and carbohydrates have been determined and they vary widely with the condition of the person and the energy expended. The daily amounts reported vary from 86 to 300 Gm. of proteins, 60 to 100 Gm. of fats 240 to 550 Gm. of carbohydrates, giving from 2000 to 6000 calories.

This gives some idea of what is being eaten. It is generally accepted that the lower amounts are better. It has been suggested that 10 to 15 per cent of the necessary calories come from proteins. If 2500 calories are needed, 250 to 375 should be furnished by proteins which would mean that 62 to 94 Gm. of proteins should be eaten daily. The proportion of fats and carbohydrates can apparently be varied within quite wide limits.

The claim has been made that carbohydrates and proteins should not be eaten at the same meal and yet every vegetable and every fruit contains a mixture of these. In the stomach the presence of some protein may aid the digestion of starch, because the hydrochloric acid combines with protein and does not so readily acidify the mixture of carbohydrates and alkaline saliva and thus stop digestion by ptyalin. While proteins largely repair the waste of the body carbohydrates and fats supply the heat and energy. Carbohydrates are also necessary to aid the burning or utilization of fat. Experiments indicate that 1 Gm. of glucose is necessary for 1.5 Gm. of fat. A fat free diet, according to Burr (4), produces a train of symptoms suggesting a deficiency disease.

Some writers speak of starchy and non-starchy vegetables. There are but few edible vegetables if any that do not contain some starch and certainly none that do not contain carbohydrates. It is interesting to note the proportion of protein and carbohydrate in some vegetables as compared to the same ingredients in some foods which are generally considered highly carbohydrate. If we dilute whole wheat flour or potato with water so that the mixture contains the same per cent of water as carrots do, carrots will contain practically the same amount of carbohydrate as the mixture. Comparing such a dilution of wheat or potato with fresh carrots we have:

	Water.	Protein.	Fat.	Carbohydrate.
Carrot contains	88.2%	1.1%	0.4%	9.3%
Wheat with water	88.2	1.5	0.27	9.5
Potato with water	88.2	1.2	0.04	10.0

Comparing other common vegetables, as beets, lettuce, cabbage or parsnips, with the concentrated starchy foods, after bringing the per cents of water together, there is comparatively little difference in amounts or proportions of proteins, fats and carbohydrates. We can speak of vegetables as being concentrated or dilute but not as starchy and non-starchy. Fresh vegetables and fruits contain from 70 to 90 per cent of water.

Or if we evaporate the water from vegetables, we may be surprised at the high percentage of protein and carbohydrate. For the sake of comparison, keep in mind that dry whole wheat flour contains about 80% carbohydrates, dry beets

contain 78% carbohydrates, carrots contain 79%, parsnips 79%, potatoes 85%, turnips 78%. Also keep in mind that average meat (which contains practically no carbohydrate) when dry contains about 55% protein while dry asparagus contains 30% protein, Swiss chard 31%, soy beans 40%, Brussels sprouts 40%.

Until recently the quality of protein had not been generally considered, but it is as important as the quantity. In the digestion of proteins, they are broken up into compounds known as amino acids. While the number of proteins is large, the number of known amino acids is not over twenty. The almost innumerable ways of combining acids and the large number of these acid radicals which may enter the protein molecule accounts for the large number of proteins. Certain amino acids are absolutely necessary for life while absence of others from food seems to have no effect. Amino acids circulate as such in the blood. This is one of the wonders of the human body that cells can take out of the blood such of the amino acids as are necessary and in correct numbers to make their own tissue.

While some proteins are more complete than others, there is no one which furnishes the necessary amino acids in proper amount to promote growth and maintain life, consequently proteins from different sources must be chosen, so that one will supplement another. The determination of which protein will supplement another has not been worked out satisfactorily to any great extent and the statements are often conflicting. The protein of wheat is deficient in the amino acid lysin, but protein of beans or peas furnishes a larger amount so that beans or peas supplement wheat. One cereal does not supplement another, neither does one legume supplement another. Milk is a general supplementary food. It is not as important to have a large intake of protein as it is to have proteins of excellent quality.

The nutrient constituents of meat and fish are chiefly proteins. It is claimed by some biologists that proteins from the animal kingdom are more easily digested than those from the vegetable kingdom and that they are richer in the amino acids necessary for life. Others claim that the vegetable proteins are as easily digested, provided the cell walls around them are broken. The unbroken wall has a detergent effect, preventing the access of the digestive ferment. Meat is perhaps more liable to carry pathogenic germs and to cause deleterious decomposition products in the intestine than vegetables. Although it is a disputed question whether a people living on both animal and vegetable food is a larger and stronger race physically and mentally than one which lives chiefly on one or the other class of foods, the race eating both is apparently the more aggressive and progressive.

The amount of protein which one should eat per day is a much disputed subject. Chittenden (5) of Yale Univesity experimented on three groups of persons—professional men, army men and college athletes. His conclusion was that about one-half the protein usually eaten is sufficient to give the best results, or about 40 to 60 Gm. Hinhede (6) of Denmark found that the amount of protein can be reduced to 45 and in some cases 25 Gm. and he claims that the men, although in good health at the time of starting, were in better condition at the end of the experiment. Most of these experiments extended over a period of seven to twelve months, not long enough to determine the ultimate result.

More is being written at present about vitamins than any other food constituent and we probably know less about them. We know them only by their effects or rather the effect produced by their absence. None of the vitamins have

been separated in a pure condition, although a recent report tells of Swedish investigators (7) who claim that they have obtained growth by feeding crystalline carotin to rats which have been depleted of vitamin A, giving the inference that there is a close relationship between the yellow pigment carotin and vitamin A. Experiments in attempting to isolate vitamin A show that the amount present is extremely small, too small to be separated by present known methods.

Vitamins are manufactured in plants and perhaps in some animals (8), but probably not in humans. Vitamin C seems to be unnecessary in the food of rats and chickens, but their livers contain an antiscorbutic substance. Vitamin D can be produced in a very concentrated form by subjecting ergosterol to ultraviolet light. Over-irradiation may destroy the vitamin. Ergosterol is an unsaponifiable body found in ergot, cod liver oil, yeast and other sources. In a recent number of the *Biochemical Journal* (9) is an article in which the writers claimed to have obtained ergosterol from the brain of a mummy about 1500 years old and, on being irradiated, effects were produced on rats similar to the effects of vitamin D.

Vitamin C is found in many vegetables and fruits, but not generally in seeds. An interesting fact is that it is formed in the sprouting of cereals and legumes. It has been shown that bleached asparagus (10) and white head-lettuce (11), the parts generally preferred, are not nearly as rich in vitamins as the green parts. Lettuce grown indoors (11) proves to be as beneficial in the growth of rats as that grown outdoors.

Some work (12) has been done to determine the effect on the formation of vitamins when the vegetable or fruit is ripened after being picked. In one experiment four lots of tomatoes were compared: 1, green tomatoes; 2, tomatoes ripened in the air; 3, tomatoes ripened in ethylene; 4, tomatoes ripened on the vine. The four lots showed no difference in vitamin B. The same amount of vitamin A was formed regardless of the method of ripening, but the amount was larger than in the green fruit. There was more vitamin C in the vine-ripened tomatoes than air-ripened or ethylene-ripened and more in these than in the green tomatoes.

Undoubtedly the soil, fertility and climate have considerable to do with the formation of vitamins. Dye and Crist (13) experimented with lettuce on different soils and found that the vitamins varied, but they concluded that robustness of plant and particularly greenness had much to do with the variation.

Sherman (14) made an attempt to establish units for measuring the amounts of vitamins. The U. S. P. gives a standard in units for cod liver oil. These units are not entirely satisfactory.

Cooking vegetables and fruits undoubtedly destroys vitamins to some extent, particularly vitamin C. Under the most advanced methods as practiced now, canning (15) seems not to do much harm. Tomatoes may be canned without apparent injury. Canned goods often retain the vitamin activity better than the fresh fruit kept in storage. Long continued low heat is more destructive than a short high heat. Drying vegetables (16), as cabbage, potatoes and carrots lessens the amount of vitamins and keeping dried vegetables for months seems to cause a further loss, although dried orange juice preserved its activity after 5 years' storage (17). Peaches (18) dried after being sulphured did not lose their activity, but those not sulphured did. Freezing (19) seems to have but little or no effect.

The maximum and minimum amounts of vitamins to produce the optimum of health have not been determined. There is no question but that there is a minimum amount. It has not been proved that there is a possibility of getting too much vitamin, but some experiments made with irradiated ergosterol indicate that such might be the case. There is more danger of getting too little than in getting too much.

Until recently but little attention has been given to the mineral constituents of foods, except iron, calcium and phosphorus. Now we know that other mineral elements are essential. Much has been written on what form of iron is most effective and many contradictory statements have been made. Mendel (20) says "The once debated question of the superiority of calcium, phosphorus and iron when furnished in some organic combination no longer excites interest since it has been observed that inorganic sources of these elements can apparently serve the requirements adequately. The evidence available points to the probability that these elements are ionized in any event before they enter the blood stream."

Of course a trace of iodine is necessary to prevent goitre. There is recent evidence to show that copper has a positive effect in increasing somewhat the production of hemoglobin, particularly when accompanied with iron. In some cases a combination of copper, iron and manganese seems to be still better. It has been suggested that it is the copper (21) in liver which makes it valuable in anemia, because the ash of liver or the hydrogen sulphide precipitate of the hydrochloric acid extract of the ash has a similar effect. The ash of lettuce relieves the anemia caused by a milk diet. Lindow, Elvehjem and Peterson (22) give the amounts of copper in various foods, ranging from 0.1 mg. in celery to 8.6 mg. in lima beans, to 44 mg. in calves' liver, based on 1 Kg. of fresh material.

Bertrand and Benzon (23) report finding zinc in many of the common vegetables, varying from 0.3 mg. in plums to 52 mg. in kidney beans. Many vegetables contain manganese (24). Traces of aluminum, arsenic, boron, bromine, cobalt, fluorine, iodine, lithium, nickel, silicon, strontium, titanium, vanadium have been found in plants and animals. These minerals may have a greater significance for plants than animals, but they enter the body and may have a necessary function. As might be expected the minerals and their percentages vary with the soil on which they are grown. In examining wheat Greaves and Hirst (25) found that the per cents varied with the soil, irrigation, climate and variety of seed.

Foods on being burned may leave an ash which is either acid, neutral or alkaline and the degree is measured by the number of cubic centimeters of $N/10$ alkali or acid required to neutralize it. Similar results take place when food is burned in the body. Most fruits and many vegetables produce alkaline products while cereals, meat, eggs and fish give acid products, and these may lessen the alkalinity of the blood and tissues which, according to some physicians, tends to cause acidosis, colds and other affections. It thus becomes necessary to choose foods whose decomposition products taken as a whole are on the alkaline side.

With this general information, how are we to choose the special foods which we should eat? This is a problem which at present each must to a certain extent solve for himself. It is one of the biggest problems to be tackled and it is well worth all the energy and attention we can give it. It will take several generations to overcome the evil tendencies and results which have been inherited and we must

not lose sight of the possible effect for good or for evil on the coming generations. There are a number of men and institutions which give definite and specific instructions as to what should be eaten and what combinations should be made. Probably all of the directions have some good and some bad. In many cases the person laying down the rules has been sick or abnormal and the conditions are different from those of a normal individual.

In determining diets we must not forget that the infant and growing child, the pregnant and nursing mother should have certain things which are not required by the ordinary adult. An adult will thrive on a diet on which a growing child will not. The child needs more minerals and vitamins.

Judging by the work done by McCollum, Osborne and Mendel, Sherman and others, there is but little difference in the digestion of various starches, provided the cell wall and the covering membrane are broken as they usually are in cooking. What little difference in nutritive value of the cereals there is seems to be in favor of wheat and this largely because of the protein.

In general it seems advisable to eat more vegetables for several reasons. They are more dilute and the appetite is satisfied before an excess is eaten, but on the other hand it is necessary to eat some concentrated food to get sufficient nutrition. Vegetable proteins supplement those of cereals. Vegetables contain vitamins and mineral salts. Some vegetables excel in one thing and some in others; tables showing the nutritive principles in common foods are given in "Sherman's Chemistry of Nutrition," and in other references appended. Above all moderation in eating must be practiced just the same as in anything else and if we do that we will have started toward better health. To quote Henry Ford, "The commonest thing we do is the thing we know the least about—eating."

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THE DETERMINATION OF DEXTROSE IN CONCENTRATED SOLUTIONS.*

BY EDMOND E. MOORE.[1]

The determination of dextrose in solutions containing from 35 to 50 per cent of this compound is of much importance in pharmaceutical laboratories. The usual reduction of divalent copper requires considerable time and for that reason it is not entirely satisfactory for control work. The same objection holds for the determination of total solids: in this case we have the added objection that any foreign material such as buffer salts or preservatives in the solution will increase the weight. The specific gravity method is quick and accurate if there are no other substances present. The optical rotation is not affected by any of the usual preservatives or buffers and this method is, therefore, the most satisfactory for the assay of solutions made from C. P. or U. S. P. dextrose.

The U. S. P. X expresses most of its physical constants at 25° C. which is the temperature we have chosen for both our specific gravity and polariscopic determinations. It was necessary to secure the data used in these determinations in this laboratory, as none could be found in the literature for dextrose solutions of the concentrations with which we are dealing and at the temperature which we feel it is advisable to use.

Determinations.

Weighings.—All weighings were made with brass weights in air.

Specific Gravity (d^{25}_4).—A specific gravity bottle was used which had been calibrated with water at 25° C. and the volume of water at 4° C. calculated.

Optical Rotation (R_{25}).—A 200-mm. tube and a sodium light were used and the temperature was maintained at 25° C. The usual precautions were taken to prevent errors due to mutarotation.

Data.—Determinations on solutions of known strength made with Dextrose C. P. supplied by U. S. Bureau of Standards, and freshly distilled water.

DENSITY AND OPTICAL ROTATION OF CONCENTRATED DEXTROSE SOLUTION.

	Dextrose.			Polariscope.	
	Per cent.	Gm. per 100 cc.	(d^{25}_4).	Reading.	Degrees (R_{25}).
1	35.22	40.38	1.1468	43° 36′	43.60°
2	37.19	43.01	1.1566	46° 40′	46.67°
3	39.53	46.19	1.1682	50° 20′	50.33°
4	41.12	48.34	1.1760	52° 42′	52.70°
5	42.95	50.92	1.1854	55° 40′	55.66°
6	44.93	53.70	1.1953	58° 40′	58.66°
7	47.25	57.04	1.2071	62° 36′	62.60°
8	47.93	58.03	1.2105	63° 42′	63.75°

Neither the specific gravities nor the optical rotations of dextrose solutions are straight line functions of the concentrations. However, if the data given in the

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* Division of Medicinal Chemistry, A. C. S., Atlanta meeting, April 1930.

[1] Swan-Myers Company, Indianapolis, Indiana.

International Critical Table II, page 347, for concentrations of dextrose below 35% are examined, it will be noted that both of these values tend to approach straight line functions of the concentration as the latter becomes higher.

For practical purposes the curves plotted from the data given in the table above may be considered as straight lines, and on this assumption, equations for calculating the per cent of dextrose and the grams of dextrose per 100 cc., from either the specific gravity or the optical rotation, have been derived.

The equation of a straight line has the form—

$$y = mx + b.$$

In the following equations

x = Per cent dextrose in Equations No. 1 and No. 3
x = Dextrose, Gm. per 100 cc. in Equations No. 2 and 4
y = Optical rotation in Equations No. 1 and No. 2
y = Specific gravity (d_4^{25}) in Equations No. 3 and No. 4
m = Average slope in the range
b = Average constant.

Transposing the above equation

$$x = y\left(\frac{1}{m}\right) - b'.$$

The value of x for the corresponding value of y can be secured from the above table. The value of m may be determined from the curve. Example—A 50.33° optical rotation is given by a 39.53 per cent dextrose solution. The slope $\frac{y}{x}$ of the curve is $\frac{1}{0.633}$.

$$39.53 = (50.33°)\ (0.633) - b'$$
$$b' = -7.68.$$

No. 1 Dextrose per cent = $(R_{25})\ (0.633) + 7.68$.

In the same way Equations No. 2, No. 3 and No. 4 are derived.

No. 2 Dextrose, Gm. per 100 cc. = $(R_{25})\ (0.877) + 2.13$.

Where R_{25} is the rotation expressed in degrees, using a sodium light and a 200-mm. tube and maintaining the temperature at 25° C.

No. 3 Dextrose, per cent = $(d_4^{25})\ (199.0) - 192.95$.

No. 4 Dextrose, Gm. per 100 cc. = $(d_4^{25})\ (276.3) - 276.58$.

When dextrose which satisfies the U. S. P. requirements is used, the percentage as calculated by either of these two methods agrees well with that secured by the reduction method. Other substances in the solution may vitiate the results secured by any of the three methods. Preservatives or buffers of the usual type will not interfere with the polariscopic determination and hence this method is more generally applicable than the specific gravity determination.

Acetaldehyde vapor may have a future use in the preservation of fruit because it kills the spores of molds without injuring the fruit itself. This conclusion has been reached by two investigators who have worked on different sides of the question. R. G. Tompkins, of the Low Temperature Station, Cambridge, has shown that acetaldehyde vapor rapidly kills the spores of the molds and fungi which are likely to cause fruit spoilage. In the same laboratory, S. A. Trout has recently found that healthy fruits can absorb a certain amount of acetaldehyde vapor without any harmful effects. The acetaldehyde is used up by the tissues of the fruit and soon disappears, leaving no trace of flavor. The possibility of applying this work to the fruit industry is under investigation.—*Science*, Aug. 29, 1930.

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NATIONAL PHARMACY WEEK.

By H. C. Christensen, President of American Pharmaceutical Association.

THE National Pharmacy Week—October 12th to 18th, inclusive—now approaching its sixth annual observance is without a doubt the most constructive, far-reaching and beneficial pharmaceutical activity that has ever been attempted for retail pharmacy.

The professional side of pharmacy is the one and only part of the business responsible for the legal recognition given the pharmacist under state pharmacy laws; it is the only excuse for his existence. Every retail pharmacist should therefore be eager to take advantage of this outstanding opportunity to bring to the attention of the public, through Pharmacy Week window displays, the fact that he is *more* than a merchant.

It is true that each year shows increasing numbers of pharmacists availing themselves of the free Pharmacy Week window display material. But why not *every* retail pharmacist? Here is a proposition which, with small effort on the part of the retailer, can be made to convey a most important pharmaceutical message to the people of every community—the message that the pharmacist is a professional man, a man who can be depended on at all times not only to supply the community needs in medicine and medicinal equipment, under proper safeguards, but who is also a source of valuable information on public health service and other scientific and semi-scientific matters. He reads the authoritative publications, books, journals, etc., of pharmacy and labors continually to keep abreast of his profession.

Nothing could be more illustrative of these attributes than a window display during Pharmacy Week, using the window streamers, chemical map and other materials made available by the Committee, thus featuring the professional and scientific side of pharmacy. With this background and a little thought and ingenuity, the pharmacist can make a very striking display by the addition of crude drugs and chemicals, pharmaceutical utensils, books, magazines, etc. There is ample opportunity for originality. The important part is to make your window displays, for this one week at least, reflect the professional side of pharmacy. Many of the most successful pharmacists of to-day realize that their side lines and merchandising successes are dependent largely upon their standing as pharmacists.

The Pharmacy Week display will prove a most effective and helpful method of impressing the public with your professionalism. Let all your window space proclaim you a Pharmacist—a professional man—during Pharmacy Week.

As president of the American Pharmaceutical Association, I want to thank the Executive Committee and all agencies that have contributed so magnificently to the success of the Pharmacy Week movement. Especially, I want to compliment and thank Chairman Robert J. Ruth for the untiring, competent and successful manner in which he has planned and directed the movement. I also want to extend thanks to Dr. E. L. Newcomb and his collaborators for planning, assigning and making available the handsomely lithographed drug maps, window backgrounds and other display material. Last, but not least, I want to thank the drug journals for their coöperation in giving space so liberally for publicity for Pharmacy Week.

DEPARTMENT OF BUSINESS MANAGEMENT

Conducted by Paul C. Olsen.*

COMMENTS, QUESTIONS AND SUGGESTIONS ARE INVITED AND WELCOME.

Readers are invited to submit comments, criticisms and suggestions regarding the material which appears in this department. The Editor also will undertake to answer questions regarding general problems of business management. Letters of general interest will be published, but the writer's name will not be revealed without his permission.

TOO MANY DRUG STORES?

BY PAUL C. OLSEN.

The answer to the question "Are there too many drug stores?" has been affirmative for many years in the United States as indeed it has been in many other parts of the world. There seem to me to be two basic reasons why limitation by restriction of drug stores in the United States is impracticable, if not impossible.

Nothing is further from my intention in the following paragraphs than to minimize the importance of professional pharmacy. I have maintained repeatedly —in these columns, and elsewhere—that the professional side of pharmacy is fundamental not only to professional but to business success.

My purpose here is merely to emphasize that many people in the United States would be denied the services of trained pharmacists if the practice of pharmacy were limited only to those stores in which the practice of pharmacy constituted the only, or virtually the only, activity.

I also have tried to emphasize in the following paragraphs the fact that success in the practice of the profession of pharmacy cannot be assured by legal restrictions. There are, to-day, in the United States many hundreds of prosperous and growing professional pharmacies which succeed because, in the population centers in which they are, there is a sufficient volume of professional business to be obtained with initiative, tact and professional skill to permit them to devote themselves exclusively to this class of business.

Of course, the protection of the public health requires that many preparations be dispensed only by professionally qualified persons but the real foundation of the pharmacist's successful professional service to his community is his professional integrity and standing, rather than legal restrictions.

I made the statement that "there seem to me to be two basic reasons why limitation of drug stores in the United States is impracticable, if not impossible," in spite of a knowledge of the situation in many cities in which druggists, after years of sacrifices, have developed a business which pays a fair living only to have it swept away in a single night by the opening of a competing store across the street, or close by, to share a trade which is not sufficient to support two drug stores.

The remedy for this situation, I feel, is education. The second store loses just as much and often more than the original store. In other words, there is nothing

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in such a situation for either store and, as these facts become apparent, it may lead to a greater common sense in establishing new stores. It is usually the case, too, that far more and better opportunities exist through the purchase of established businesses than with the establishment of new drug stores.

The two basic reasons which, in my judgment, make impracticable or even impossible the limitation of drug stores in the United States are as follows:

If any one disagrees with my premises or conclusions, I hope they won't hesitate to say so in plain and frank language.

The first reason is the distribution of the more than 120,000,000 people who live in the United States. Although a large proportion of these people live in the large cities, it is none the less true, at the other extreme, that close to 50 per cent of the people still live on farms and in towns of under 2500 population; limitation would mean a great inconvenience for those who live in the mountain states, and in other thinly populated sections.

The other basic reason that limitation of drug stores "is impracticable, if not impossible," is that it is a legal impossibility to establish selling restrictions only on a relatively small group of the items which are stocked to-day even in the professional drug stores, or pharmacies, and there is and can be no restriction upon the sale of many other items which are commonly accepted to-day as drug store items.

"PINE BOARD" COMPETITION.

BY PAUL C. OLSEN.

One of the newest of the directions from which competition is felt in the retail drug business is the so-called "Pine Board" stores. This competition takes its name from the nature of the fixtures in these stores: plain shelving, few or no showcases and none of the other expensive accompaniments of the modern drug store to-day. Usually, also, there is no prescription department corresponding with legal requirements and the necessity of employing registered pharmacists at salaries considerably above those at which ordinary retail sales people can be obtained.

Competition of this kind has so far developed to the greatest extent in several California cities. The reason the competition is felt so keenly by established retail druggists is the policy of these "pine board stores" to limit their stocks to the relatively small number of items which are well known and readily salable and on which price competition is keen. It is the policy, also, of these stores to pick up job lots of distress merchandise and, also, to obtain standard merchandise at sacrifice sales and auctions of drug stores in trouble.

The result is that this popular merchandise frequently is offered at prices astonishingly low and in many cases below wholesale cost.

There is no denying that competition of this kind where it exists (and it may spread) is keen and calls, therefore, for alert thinking and aggressive action.

One druggist, situated two doors from such competition, found that after the early novelty of his "pine board" competitor had waned, his regular customers and new ones, too, gradually returned to him.

Why? The answer is found in the incomplete stock of the "job-lot" merchant, which necessitates the purchase by the customer of items with which he or she is not acquainted and, usually are found to be of inferior quality. There is the opportunity for the established drug store to assert its superiority. Its stock is complete. People soon become aware of the disappointments sooner or later to be felt in attempting to deal continuously with establishments which characteristically have incomplete stocks.

This doesn't deny, however, that price competition is a decidedly important factor in the business of the established drug store. It is fortunate indeed, that when price competition makes it necessary, the selling prices of popular merchandise can be reduced below the customary levels to a considerable extent without running the risk of disastrous losses. This is possible because of the volume of sales on such merchandise and the rapid turnover.

The survival of the established drug store in the face of this and related competition is indicated, also, because of the opportunities it has to sell merchandise which is not, and in many cases, cannot be included in the stock of this new type of competitor. This means, particularly, merchandise associated with the professional side of pharmacy. Thus is indicated once more how important, valuable and profitable the professional side of pharmacy is to the conduct of retail drug stores to-day.

RETROSPECT OF FIFTY YEARS AGO.

A small plantation of fourteen acres of *Cinchona Ledgeriana*, set 5 feet apart, planted in 1862, was first cropped in 1872. In the seven succeeding years it yielded 26,825½ kilos of bark, which sold at 5 fr. 30 c. per ½ kilo, or 141,766 fr., or 1448 fr. per acre during the whole life of the plantation. Mr. Moens has kept a register of the history of a number of trees. The most remarkable tree in the East is No. 67, a *Calisaya Ledgeriana*. It is eighteen years old, and its bark has yielded 13 per cent of pure quinine. No. 78 comes next in order of merit, its bark yielding 10.5 per cent of quinine, and no other alkaloids. It is of the same species and age, and grows in the same garden, but the bark is very rough, the leaves are broad and green and the flower is pure white. A *succirubra*, fourteen years old, is 63 feet high and 3½ feet in girth.—*Chemist & Druggist*, August 30, 1930.

MODERN MEDICINE BEGAN WITH PASTEUR.

In a recent address, Surgeon General Cumming said in part: "Modern medicine really began with the work of the great Frenchman, Louis Pasteur, which was carried on from 1857 to 1885. Pasteur successfully disproved the belief which was almost universal at that time, that putrefaction, fermentation and similar processes were the result of what was spoken of as the spontaneous generation of lower forms of life; *i. e.*, that such forms could originate *de novo* from inanimate matter. Pasteur's work included the discovery that certain diseases both in man and certain of the lower animals are due to the growth and countless multiplication in their bodies of microscopic plants (as a rule they are classed as plants) known as microörganisms or disease germs, or bacteria."

PASTEUR MEMORIAL LIBRARY.

Well-known Americans, some of them residing in France, are taking active interest in the Pasteur Memorial Library at the University of Strasbourg. This undertaking is intended not only as a monument to the illustrious scientist, but also to strengthen the bonds of friendship between France and the United States. Several hundreds of valuable books, some of them in choice bindings, already have been contributed.

NEW RADIUM SPRING IN BOHEMIA.

In the little village of Tiefenbach near Joachimsthal in Northwest Bohemia, where Madame Curie first discovered radium, a new radium spring has been found which is said to rival even the famous Joachimsthal springs.

SEVEN WAYS TO MEET COMPETITION.*

(Abstract of Paper.)

BY CLYDE EDDY.[1]

There are in the United States approximately 61,000 retail drug stores, one for every 2000 of our population. Fifty-seven thousand of those stores are operated by individuals as independent outlets and 4000 of them are chain store links. Six of every hundred drug stores in the country, therefore, are chain drug stores.

The total volume of retail drug business transacted in 1929 is estimated, in round numbers, at $1,993,000,000. Of this amount, independent stores sold $1,630,000,000 and the chains, $362,000,000. The chain store figure does not seem particularly imposing until we realize that it represents 18 cents of every dollar spent last year for drug store merchandise. In other words, 6 per cent (approximately one-sixteenth) of all the stores are doing 18 per cent (more than one-sixth) of all the business.

How far the chains ultimately will go in corralling the nation's retail drug business remains to be seen. A recent survey conducted by the United States Bureau of Census in eleven typical cities ranging in population from 26,000 to 3 millions indicates that in urban centers, at least, chains are now selling 29 per cent of all the drug store merchandise that is sold each year to the American public.

Producers are seeking to gain control of their distribution and the resulting growth of chain stores is revolutionizing our entire merchandising system. The drug field has witnessed the merging in recent years of Drug, Inc., the world's largest manufacturer of proprietary remedies, with the Louis K. Liggett Co., the world's largest operator of retail drug stores. The ultimate effect of that combination upon the welfare of thousands of retail druggists—and upon the distribution of drug products to the American people—doubtless will be profound. Drug, Inc., now makes millions of direct sales each day through 600 Liggett stores located at strategic points throughout the United States and influences other millions of sales made through the stores of 10,000 Rexall agents.

Present-day trends in retailing clearly are in the direction of large scale marketing, which is being achieved through the development of regular and voluntary chains, consolidations of jobbers, more intimate coöperation between manufacturers and retailers, and between jobbers and retailers, and material shortening of the distributive channel between the manufacturer and the consumer, with a corresponding decline in the importance of the wholesaler. It is probably safe to predict that there soon will be relatively few dealers who are not tied up in some way, formally or informally, with at least one of these consolidations or coöperative movements. No one can foresee the outcome of this revolution, or evolution, in retailing, or how long it will take but there are indications that the trend toward large-scale retailing is still in its infancy and that changes of great importance are likely to occur in the next few years.

Authorities estimate that the chains finally will sell up to 50 per cent of all drug store merchandise sold in the United States. How near they come to

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* Section on Commercial Interests, A. PH. A., Baltimore meeting, 1930.

[1] Manager, Merchandising Service Division, E. R. Squibb & Sons, New York.

achieving sales represented by that figure depends largely upon the willingness of independent retailers to face the facts of chain store growth—and upon the character of the effort they make to meet the challenge of the chains. Which brings me to the subject that I should like to discuss with you to-day—"Seven Ways to Meet Increasing Competition."

1. CENTRALIZE YOUR BUYING.

So far as it is practicable centralize your purchases with a few selected wholesalers and manufacturers. Buying from too many sources results inevitably in buying too many lines. The total stock becomes too large for quick turnover, no line is quite complete, and dissatisfied customers are certain to result. Buying must be centralized to be certain of complete, adequate stocks for a minimum investment. Concentrated purchases mean quicker turnover. Also, if you place most of your orders with a few selected sources of supply, they will be more likely to extend credit when you need it. They will feel personal responsibility for your success and, in many instances, in line with the modern trend, they will offer you from time to time invaluable merchandising aid.

When you buy from too many sources, you usually buy too many lines—almost without knowing it. Then you cannot keep an adequate stock without investing money in too many places. Your total stock is too large for quick turnover but lines are short, and you run the constant risk of dissatisfying customers. When you centralize your buying, you get complete, adequate stocks with a very much smaller investment. You satisfy customers, yet your average stock remains low. The first big result of concentrated purchases is—quicker turnover.

Centralize your buying and, when possible, buy direct. Quantity buying with its larger discounts has contributed much to the prosperity of every successful retailer. Nor is it necessary as a rule to buy in excessive quantities to get the best prices. The wise manufacturer offers quantities which suit the needs of his distributors—and whittles his deals down to fit the shelf and counter space of his average retail customer.

Hand to mouth buying is advisable only within certain limits and can easily be overdone. Buy in small enough quantities to avoid loss through stock shrinkage and idle capital but remember that starved stocks mean incomplete stocks and that few things are more damaging to a business than a reputation for being "just out" of things called for. Whatever the item may be, you lose much more than the profit on that piece of merchandise—you stand a good chance to lose the customer as well, and as many of her friends as she may tell that your stock is incomplete.

2. BUY ONLY WHAT YOU KNOW YOU CAN SELL.

Buy only what you know you can sell. Successful merchants make money selling fewer lines. Unsuccessful retailers are left to hold the bag, with too many brands, too many varieties, incomplete stocks of fast-moving lines and surplus stocks of slow-moving ones. Concentrate, pick out the real demand merchandise and carry a full and complete assortment.

If you operate a so-called merchandising store decide whether you are going to buy for the few or for the many. This is a question which every retailer has

to face. Shall he be influenced by a few customers, or shall he buy the goods which most of the people want most of the time? No retailer has to carry every item suggested to him by a customer or by any one else. Active demand is the key. Put your money in the right place—and not try to have everything, but have what the mass of the people want.

Buy only what you know you can sell. There has been great waste and loss arising from injudicious choice and slack, careless management of the stock of goods carried. Too much of the stock in the average retail drug store is apt to consist of unadvertised, private brand merchandise. It does not move. It makes no profits. A retailer, at frequent intervals, should make a drastic "check-up" of the items he has been handling. If they prove to be slow-moving and unprofitable, he should be quick to eliminate them from his stock.

3. ADVERTISE YOUR STORE, PERSISTENTLY.

Advertise your store, persistently and in every way that you profitably can.

The man who operates a store with a clean and well-lighted interior and with well-dressed windows; who provides a comprehensive service and who is pleasant and honest in his contacts with his customers—is advertising.

No business can be run—in fact no sale made—without advertising. Advertising does not consist exclusively of printed word or picture. Advertising consists of doing those things that attract attention to and create a favorable impression of the business. Hence, a proprietor's personality, his correct stock of goods, his attractive store and the high quality of the service he gives his customers are natural advertising assets.

Advertising can be effected through attitude, word and actions. A customer who has been courteously and well served advertises the store. The clerk who is rude advertises the store—adversely. Money spent for excellent copy in good media will not bring permanent customers to a dirty, mismanaged store, attended by indolent employees and where service is an unknown element.

Examine the front of your store, it is your best advertising medium. It carries your message every day to your prospective customers. Make it talk for and not against you. Use plenty of fresh paint and bright light. Keep your windows clean, orderly, attractive—with clearly marked prices on your goods, and a change of display every week. Make your store front advertise a live, progressive, modern store—and have your store "as advertised" inside.

Follow up your store and window display advertising with a monthly store news bulletin or some similar announcement mailed to a selected list of your substantial, good-paying customers. Use your local newspaper, regularly, if it really covers your territory and reaches the people whom you want to reach. And, in your advertising, keep these simple rules in mind: Don't try to say too much. Make your announcment carry one big impression. Give one selling point the "key" position. Don't crowd, and don't be afraid of white space. Make your advertisement simple, sensible and easy to read.

Just a word concerning coöperative advertising. Go in for it. Its use helps hold local associations together and the kind of "copy" usually employed helps build up good will for pharmacy and pharmacists. But don't use the group strength of your organization as a club to coerce any manufacturer into helping

to defray the cost unless you know that the manufacturer already is helping to pay for chain store advertising. The N. A. R. D. has adopted a resolution opposing retail store advertising paid for by manufacturers, its members knowing that the chains are better organized than are independent retailers for the use of subsidized advertising and that when a manufacturer coöperates with the independents, he lays himself open to insistent year-after-year demands for similar subsidized advertising on behalf of the chains.

4. MAKE YOUR STORE SELL FOR YOU.

Does your store function as your master-salesman, displaying merchandise and creating sales, or does it serve as a warehouse instead, merely holding—and sometimes hiding—the articles you have for sale?

Good display of merchandise is the best sales help that the average retail druggist can employ. People get impressions through the eyes quicker and more clearly than in any other way. Eighty-seven per cent of the impressions that the average person receives of the world about him are received through the sense of sight alone. Sound conveys 7 per cent of the impressions he receives; smell, 3.5 per cent; touch, 1.5 per cent; and taste, 1 per cent. The eyes convey thirteen times as many impressions as their nearest competitors, the ears. How much easier it is, therefore, to attract attention through sight than through any of the other senses!

Chain store success is based largely upon 100 per cent display of merchandise. Goods in boxes, under counters and tables, must be asked for. The same merchandise, well displayed, finds buyers—creates sales. The selling power of the store itself is the chain's strongest asset—and that means getting as near as possible to 100 per cent display.

Open displays make for successful selling and open displays call for display tables, not too high. Allow plenty of room in your aisles to lead people through your store—and then place your merchandise out where customers can see and handle it. Women especially buy with their eyes and hands, and they love to shop—give them a chance, they buy 78 per cent of all the merchandise you sell.

Show demand merchandise. Keep your fast-selling goods well displayed. Nothing so shakes the confidence of a customer as the constant display of off-brand merchandise with never a glimpse of a nationally advertised product on show in the store. Display and sell demand merchandise if for no other reason than to reassure your regular customers, and to attract new ones to your store. The display of demand merchandise brings customers into your store, creates confidence in the mind of the consumer, suggests—and makes possible—the sale of additional, long-profit products and adds to your net profits by increasing your turnover.

Use plenty of light in your store, light is what your displays talk with. A well-lighted store attracts and interests customers while a dimly lighted one drives them away. If you doubt this, increase the power of all the light bulbs in your store and watch the results in added sales. Actual experiments show that you cannot economize on lights. The sales curve sags faster than the drop in meter charges—the dollars in sales you lose exceed the cents you save on your electric bills. The unit of measure of light is called the foot-candle. In a recent store

test, when the level of illumination in the windows was 15 foot-candles, the people who stopped at the windows were counted. When the level of illumination was increased to 40 foot-candles, it was found that 33 per cent more people stopped to look at the window. Increasing the illumination to 100 foot-candles attracted 73 per cent more people. While the cost of lighting the window increased as more light was used, the number of people observing the display was increased much more. The increase in sales and consequent profits far over-shadowed the increase in the cost of lighting. Too many independent stores are badly lighted. Plenty of light should be the rule in every retail store.

5. PERSONALIZE YOUR SERVICE TO YOUR CUSTOMERS.

As an independent retailer, you have one outstanding advantage over your chain store competitors—you can give your customers individual, personalized service. Assuming that your personality is at least as good as the average, try to get more of it into your store. Do less bookkeeping and serve more customers. In any line of trade retailing is a service, in pharmacy a large part of it is *professional* service which can be rendered to best advantage only by the pharmacist himself. Receive your customers as acquaintances and friends. Satisfy their complaints, retrieve lost sales, meet their individual requirements. Capitalize your greatest asset, personalize your service to your customers.

Close contact with your customers and direct, personal interest in selling, will give you an intimate supervision over your employees and that supervision, in turn, will enable you to prevent in your store "the raw, crude incidents that happen daily to customers served by uninterested and inefficient clerks in competing chain stores." Only by "waiting on the trade" can you learn precisely what your customers want. Only by spending a large part of your time in the front of the store can you be certain that they get what they want—when and as they want it.

Every person in your store represents your store to your customers. How well are you being represented while you are here to-day? Every sale is a test, and an opportunity. Do your clerks represent you to advantage every time? Do they know the merchandise they are selling? Do they tell a plain, truthful story about it to each customer? Are they courteous and prompt? When they make a sale do they suggest a logical additional item? Do they greet your customers with a surly "Sumpin for you?" or with a cheerful "Good morning?"

Here are ten fundamental rules which should be enforced in every independent store:

1. Be alert.
2. Be courteous.
3. Be eager to serve.
4. Be attentive.
5. Be accurate.
6. Know the goods you sell.
7. Tell the truth about merchandise.
8. Call attention to new merchandise and to special offerings.
9. Give quick service.
10. Be agreeable, smile.

Those rules should apply to the proprietor, too, and remember that the proprietor who is always on his toes finds that his clerks are quick to imitate him, to his disadvantage, if he is careless, lazy or disinterested in trade.

Thirty per cent of lost sales are lost because of inefficient salesmanship.

Another 33 per cent are lost because of poor service. The human element enters to that extent into the success or failure of the average store. It is difficult to over-estimate the importance of higher standards of personnel; of better training, of greater efforts to please and hold customers.

Capitalize your greatest asset—personalize your service to your customers.

6. CONSIDER THE IDEA OF OFFERING THE PUBLIC LIMITED PROFESSIONAL SERVICE.

The personal and direct ownership of independent retail stores is an advantage because it enables independent retailers to modify their business methods or policies whenever such changes may be needed to meet new conditions in their local retail fields. Pharmacists, confronted with increasing competition from the chains, have found it profitable to establish so-called professional drug stores, and to specialize in quality merchandise which the chains do not carry, or do not advertise. If you find yourself competing at too great a disadvantage with the chains, give thoughtful consideration to the possibilities of specializing in professional service, and quality merchandise. By pushing quality lines you can place yourself practically outside of cut price competition and you will not forget, of course, that even the quality line needs national advertising to make it well enough known to the public to insure consumer demand from displaying the dealer aid material of a manufacturer of quality products whose name has been made well known to the public by consistent national advertising.

Study your community carefully. Adapt your store to the people you want to serve. "Use, to the fullest extent, your intimate knowledge of the needs and wants of your customers—but be sure that you have this intimate knowledge, and that it is accurate and up-to-date."

There is plenty of room in this country for alert and progressive independent stores. Every state is dotted with retail druggists who are making their stores invaluable to the communities that they serve. Those pharmacists supply the needs and wants of their customers in a personal way that cannot be duplicated. And, because they are specializing in personal, or professional, service and because they supply quality products which the chains do not find it profitable to advertise, those far-sighted independent retailers are not much concerned about cut prices. They sell quality and service at fair prices which their customers gladly pay.

7. ORGANIZE FOR STUDY OF RETAIL DISTRIBUTION.

During the war period—1914 to 1919—production, broadly speaking, was the source of most of the difficulties that business men had to face. In the intervening years the problems of production have gradually been overshadowed by the difficulties of marketing.

Many of the best minds of American business have been engaged with the problems of distribution. Manufacturers, wholesalers and chain store operators have interested themselves in providing ways to move merchandise smoothly and economically from the manufacturer to the consumer, and each group has presented a different solution to the problem. The principal results of all this activity have been rapid expansion of chain and department stores; the linking together of retail and manufacturing groups; the merging of wholesalers; the development of coöperative buying and the growth of voluntary chains.

All of us are familiar with the efforts that have been made by others to solve the problems of the retailer—and await with interest the announcement of a comprehensive plan by means of which the retailer shall solve his problems for himself. A committee of this ASSOCIATION should be at work upon those problems during the ensuing year and to that committee, and to the individual druggists of the United States, I respectfully refer the seven suggestions that I have made concerning ways and means of meeting increasing competition in the drug field.

It is my firm belief that the independent retailer in the drug field will find a way not only to hold his own, but to strengthen his position in the present scheme of things.

PHARMACEUTICAL TRAINING VERSUS THE MODERN PHARMACIST.*

BY WILLIAM F. REINDOLLAR.

The recent years are characterized by the advancements they have recorded in pharmaceutical education. An increased prerequisite standard for matriculation in accredited colleges of pharmacy was but an initiatory step to attainments more significant. The scope of the pharmacy course has been extended by the addition of another year, has been rendered more comprehensive by the presentation of general educational subjects, and more pragmatic by the consideration of commercial, as well as professional problems. State boards of pharmacy have coöperated with the colleges to assure the public that none but rigidly trained and thoroughly qualified individuals are permitted to practice. The registered pharmacist of to-day is not only an individual of demonstrated competency but one who compares quite favorably with his contemporaries in the allied professions.

With this very efficient training together with the high sense of responsibility supposedly instilled during its acquirement, as antecedents, one might expect work of a superior quality, characterized by accuracy and precision. Such, however, is not entirely the case, as the investigation herein will reveal. While the objection may be raised that this report is somewhat premature when applied to the recent graduate, and that older pharmacists are of a necessity included, let it be borne in mind that in the state wherein these data were collected, prerequisite requirements have been a reality for a decade, and the three-year course in pharmacy, for five years.

A part of the work of the Food and Drug Control Laboratory of the Maryland State Health Department consists in the routine examination of samples of drug products collected from the various pharmacies throughout the state. For the purpose of this study a list of the simpler galenicals of the U. S. P. and N. F. together with several extemporaneous preparations, were selected and their analytical results compiled and examined. The selection comprises those products which are, or should be, prepared by the retail pharmacist; the period of collection embraces the years 1925–1929, inclusive. In order to eliminate as far as practicable the "machine-made" product, and thoroughly realizing that not all galenicals that should be, are compounded by the retailer, the following precautions were entertained:

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* Section on Practical Pharmacy and Dispensing, A. PH. A., Baltimore meeting, 1930.

(*a*) No products purchased from wholesale establishments, confectionery or general merchandise stores were included.

(*b*) Any article that was definitely known to have been purchased by the retailer from a manufacturer was excluded.

(*c*) Where trade conditions indicated clearly that an article was more likely to have been purchased than prepared, few samples of that article were collected from retailers.

(*d*) Only those phases of the analysis that throw light on the skill of the compounder were considered.

(*e*) An attempt was made not only to include the preparations most likely to be made in the store but also those for which there is a fairly consistent demand.

(*f*) The quantity of sample purchased, and types ordered were such that extemporaneous preparations were favored.

Even with these precautions it is not believed that an ideal selection was obtained, although a fair approximation may be assumed.

Sample.	Official limits or implied limits.	D.C.T. limits.	% Total beyond D.C.T.	% Samples below D.C.T.	% Samples above D.C.T.	Extreme variations.
Lin. Camph.	Camph. 19–21%	18–22%	12.1	5.9	6.2	7.72–25.62%
Lin. Chlorof.	Camph. 3.15 Gm. per 100 cc.	2.83–3.47 Gm.	18.5	11.3	7.2	1.59–4.01 Gm.
	Chlorof. 30% vol.	27–33%	26.2	24.6	2.6	6.15–37.00 cc.
Liq. Calc. Hydrox.	0.14–0.17 Gm. per 100 cc.	Same as U. S. P.	12.9	8.9	4	None–0.19%
Tr. Ferr. Chlor.	Not less than 4.48% Iron	Not less than 4.03% Not more than 4.93%	28.3	6.1	22.2	0.20%–6.71%
Syr. Ferr. Iod.	U. S. P. IX 4.75–5.25% U. S. P. X 6.5–7.5 Gm. per 100 cc.	6.3 Gm.–7.7 Gm.	23.9	22.6	1.6	1.72–13.7 Gm.
Sp. Ammon. Arom.	1.054 Gm. NH_3 as Carb.	0.94–1.16	25.8	19.4	6.4	0.21–1.32
	0.862 Gm. NH_3 as NH_4OH per 100 cc.	0.78–0.95	64.6	53.3	11.3	0.48–2.50 Gm.
Sp. Menth. Pip.	IX 10.6% v. implied 10% v. implied	9.54–11.66% 9–11%	38.8	13.5	25.3	1.60–12.52
Liq. Pot. Ars.	0.975–1.025 Gm. As_2O_3 per 100 cc.	0.9–1.1 Gm.	11.7	11.7	..	0.68–1.10 Gm.
Liq. Mag. Cit.	Magnesium Citrate—not less than 1.5 Gm. MgO per 100 cc.	1.35–1.65 Gm.	43.8	17.5	26.3	1.00–2.11 Gm.
Tr. Iodi	6.5–7.5 Gm. I per 100 cc.	6.3–7.7 Gm.	4.8	4.8	..	5.90–7.27
	4.5–5.5 Gm. KI	4.5–5.5 Gm.	..	..	..	4.63–5.49
Acid. Hydrochl. Dil.	9.5–10.5% HCl	9%–10%	37.5	31.2	6.3	2.97–12.00
Ung. Hydrarg. Oxid. Flav.	1% HgO yellow	0.9%–1.1%	64	8	56	0.82–3.04
Ung. Zinc. Ox.	20% ZnO implied	18%–22%	37	12	25	17.32–26.95 (Small no. examined)
Sat. Sol. Pot. Iodid.	97–103 Gm. KI per 100 cc. N. F.	90–110 Gm.	80	80	..	48.85–97.54
Argyrol Solution	25%	22.5–27.5 Gm.	52.6	42.1	10.5	11.15–37.88 Gm.
	10%	9–11 Gm. per 100 cc.	54.5	36.3	18.2	6.61–19.59 Gm.
Sat. Sol. Boric Acid	5.14 Gm. per 100 cc.	Not less than 4.63 Gm.	75	75	..	0.96–5.10 Gm.
Quinine Capsules	5 grains	4.5–5.5 Grs.	55.8	34.9	20.9	1.92–6.35 Grs.
	3 grains	2.7–3.3 Grs.	35.7	28.6	7.1	2.39–3.52 Grs.

The several series of samples examined are: Camphor Liniment, Chloroform Liniment, Lime Water, Tincture of Ferric Chloride, Syrup of Ferrous Iodide, Aromatic Spirit of Ammonia, Spirit of Peppermint, Fowler's Solution, Solution of Magnesium Citrate, Tincture of Iodine, Dilute Hydrochloric Acid, Yellow Mercuric Oxide Ointment, Ointment of Oxide Zinc, Saturated Solution of Potassium Iodide Argyrol Solution, Saturated Solution Boric Acid, Quinine Capsules—which to-

gether with their collected data are listed in the table. The succeeding columns record: Name of sample, official or implied standard, "D.C." Tolerance, total per cent falling outside the tolerance, per cent below T, per cent above T, extreme variations. For the purpose of this study it was thought well to establish an extreme standard ranging from ten per cent below to ten per cent above the mean official or implied standard and arbitrarily called the D.C. or Drug Control Tolerance. This limit is expressed in Column III as the D.C.T., while Columns IV and V and VI give, respectively, the percentage of samples examined which occur beyond that tolerance, below it, and above it. The last column enumerates the extreme variations encountered.

A general consideration of the results *in toto*, with particularized comments in certain cases, will be less time consuming than a complete review and yet will be sufficiently explanatory.

It will be noted that quite a large percentage of the results fail to meet the generous limits set by the empirical tolerance. These range from 11.7 per cent in the case of Fowler's Solution to eighty per cent for the Saturated Solution of Potassium Iodide. In no case do all the samples of one class comply with the standard.

The extreme variations are extreme in the strongest interpretation of the word, the lower limits approaching zero, the upper, saturation. These extremes, however, represent isolated cases and their presence is consistent with the law of probability, and is to be expected when a large number of samples of a class are examined.

The most noteworthy fact observed is that the percentage of variation above the tolerance in most cases compares favorably with that below and in all cases, except where saturation is the maximum limit, is significant. Thus, for Camphor Liniment, 5.9 per cent fall below the tolerance while 6.2 per cent rise above it; Tincture of Ferric Chloride, 6.1 per cent below, 22.2 per cent above; Solution Magnesium Citrate, 17.5 per cent below, 26.3 per cent above; Lime water, which is almost a saturated solution, 8.9 per cent below, 4 per cent above; 25 per cent argyrol solution, in which lack of accuracy in preparation tends toward low concentration and in which cost is a considerable item, 42.1 per cent below, 10.5 per cent above. Fowler's Solution, Tincture of Iodine, and necessarily, the saturated solutions of Boric Acid and Potassium Iodide were groups that contained no individuals exceeding the tolerance.

The number of samples vary from less than a score in one or two groups to well over five hundred in others. Zinc Oxide Ointment and Tincture of Iodine, because of the difficulty of obtaining samples known to have been made in retail pharmacies, belong to the former group, while Lime Water and Camphor Liniment, are classed with the latter.

Several cases of gross and inexcusable errors may be mentioned, although the samples involved were not tabulated. On various occasions samples purchased as Camphor Liniment proved upon analysis to be Castor Oil, Chloroform Liniment to be Camphor Liniment, Lime Water to be Dobell's Solution, and again, plain water.

What is the explanation of these incongruous, not to say illegal products, most of which may be safely traced to the man behind the prescription counter?

It is most certainly not in his pharmaceutical education and training—they are more efficient to-day than ever. It cannot be assigned to laxity in the registration machinery as any candidate of recent years will attest. Furthermore, it is not due to a class of individuals whose moral fibre is so weakened that they are deliberately addicted to sophistication, for an inspection readily reveals the costliness of a large percentage of their mistakes. There is only one logical conclusion to be drawn. The pharmacists' errors are due to carelessness, pure and simple, to negligence gross and inexcusable. Unless he can be made to realize his responsibility to his community, to his profession and to himself, unless he can be induced seriously and conscientiously to practice his calling in the approved and time-honored manner, then the effort and expense of his training are wasted.

ABSTRACT OF DISCUSSION.

The author of the paper stated that accuracy and precision means very little if the pharmacist is going to forget his training. In the work reported there is evidently a display of negligence.

Frank S. Fuqua said that some druggists think they are too busy and cannot take the time to fill prescriptions. They would rather pour a preparation from a bottle to another and call it pharmacy. Some of the students fail to appreciate their responsibility to the public.

Clyde M. Snow said that every teacher in the schools of pharmacy endeavors to impress responsibilities upon the students, and if they cannot give due consideration to their responsibilities it is best for them to withdraw from the school. If the student cannot be interested in his work during the school years there is little chance of his becoming interested later. Inefficiency is the fault of the individual more than of the instructors who endeavor to guide him.

NARCOTIC CONTROL IN KOREA.

The Government-General of Chosen has revised its law prohibiting the cultivation of the poppy except by pharmacists. The period of the law was fixed at 1918, but the revision was made from the standpoint of encouraging home-made industries and self-sufficiency in the supply of medicines. The Opium Law promulgated on June 1, 1919, provided that poppies were to be turned over to the Government-General after receiving compensation therefor, and the poppies so purchased were turned over again to the Taisho Seiyaku Kaisha. This policy has been observed until the time when the control of opium passed from the hands of the Monopoly Bureau to the Police Bureau. With the expiration of the term of contract with the Taisho Seiyaku Kaisha in 1928 the change was again made by which the manufacture of medicinal opium and opium salts came to be placed under the jurisdiction of the Monopoly Bureau. The authorities expect to stop opium smoking within the next ten years. Curiously enough, the strict control of opium smoking enforced in the peninsula resulted in an increase in the number of morphine addicts; the number of addicts in 1922 was 1578 but it increased to 5370 by the end of 1927.

REVISED REGULATIONS.

The revised Opium Law of Korea was promulgated in the name of the Governor-General Viscount Admiral Makoto Saito on July 7th, this year. Article 5 was so revised that opium only for medicinal purposes can be sold by the Government, whereas in the old provision, opium could be sold for the manufacturing of drugs also. Article 6 was entirely struck off as it became unnecessary, since the supervision of the poppy industry was placed under the Monopoly Bureau. Article 7 was also struck off for the same reason. Revisions were also made in five other articles, thereby making the transfer of opium between individuals, including physicians, dentists and medical students more and more strict. The revised Article 5 runs as follows: Opium may be sold or transferred for medicinal purposes after being sealed. Article 6 provided that opium is to be transferred to a company specified by the Government-General when it is to be used for the manufacturing of medicines.

THE DEPARTMENT OF THE AMERICAN ASSOCIATION OF COLLEGES OF PHARMACY

When the Charters' Report was issued under "Basic Material for a Pharmaceutical Curriculum," teachers of pharmacy were very much pleased to note the coöperation of the Public Health Service in the preparation of the subject of "Public Health." The following paper by Dr. Taliaferro Clark, Assistant Surgeon General, U. S. Public Health Service, presented at the Teachers' Conferences at the last meeting of the American Association of Colleges of Pharmacy is further evidence of the willingness of the Public Health Service to coöperate with Pharmacy in determining what should be taught pharmacists regarding public health. As stressed in the Charters' Report, the pharmacist holds a strategic position in the dissemination of information regarding public health and it is the duty of every pharmacist to secure authentic information on this subject and to assist in its dissemination. This timely paper by Dr. Clark points the way for the development of a satisfactory course in public health in our colleges of pharmacy.—C.B. Jordan, *Editor*.

THE TEACHING OF PUBLIC HEALTH.

BY TALIAFERRO CLARK.

ASSISTANT SURGEON GENERAL, U. S. PUBLIC HEALTH SERVICE.

It will probably interest you to know something of the steps taken in the development of the preparation for a course in public health to be included in the standard curriculum for colleges of pharmacy. As you know, the Commonwealth Fund, in 1924, undertook a study of pharmaceutical education, with the cooperation of the American Association of Colleges of Pharmacy, the National Association of Boards of Pharmacy and the National Association of Retail Druggists, which was headed up in the University of Pittsburgh under the direction of Professor W. W. Charters. After the study had been carried on for some time, it became evident to the directing heads that in working out a curriculum for colleges of pharmacy it would be possible to do so in a manner as to be of great assistance to the public health movement through the retail druggists. Accordingly, a letter was addressed to the Surgeon General of the Public Health Service by Professor Charters requesting the assistance of the Public Health Service in the preparation of an outline of such a course and it fell to my lot to be designated as one of the officers who participated in this work.

In accordance with an agreement arrived at in conference with representatives of the Committee on Curricula, Doctor A. R. Bliss, Jr., and Doctor A. B. Lemon, an outline on public health topics was worked out and incorporated in the report, "Basic Material for Pharmaceutical Curriculum," prepared under the direction of Doctors Charters, Lemon and Monell, published in 1927. The subject matter of the course was arranged in a series of topics instead of lectures in order to conform with the "Pharmaceutical Syllabus" prepared and published by the Pharmaceutical Syllabus Committee representing the AMERICAN PHARMACEUTICAL ASSOCIATION, the American Association of Colleges of Pharmacy and the National Association of Boards of Pharmacy.

I. Number of Hours.

In an investigation of courses of study in 57 Class-A medical Schools, in 1922–1923, it was found that from 3 per cent to 4 per cent of the total hours out of 108 to 176 hours for the entire course were assigned to hygiene and sanitation.

II. Number of Courses.

Usually only one, though the total hours are the same as if several.

III. Scope.

Lectures and demonstrations.

IV. Best Year for Course.

Third or fourth.

V. Purpose of Course.

(1) To equip as a hygienic advisor, and (2) to deal with environmental factors.

VI. Scope of Course.

This course should give information with regard to (1) organized community health programs, and (2) the relation of the pharmacist to the work of official health agencies, and (3) to certain fields of health activities.

VII. Topics. (See program.)

No attempt was made in the preparation of the outline to treat the subject matter as comprehensively as if it were for use in schools of public health. Such a comprehensive course and in such detail would be beyond the ability of the average student of pharmacy to master by reason of his lack of a medical background, the absence of the necessary clinical facilities in schools of pharmacy, and the difficulty that would be experienced to include public health lectures throughout the entire period of study required for a degree. Therefore, the topics were selected and arranged so as to facilitate the instruction and familiarize students of pharmacy with some of the essential public health problems, indicate profitable lines for postgraduate study and fit them properly to advise the many persons who will consult them on health problems.

Moreover, the outline does not call for any extended discussion of special diseases, because such instruction can be but imperfectly given except in medical schools. A smattering of information on such matters is probably more dangerous than no information at all. For this and the foregoing reasons the course of instruction should deal with broad underlying principles and be so arranged that the students in one part of the country will obtain the same fundamental instruction in public health as those attending a school of pharmacy in another section of the country, except as may be modified by local conditions wherever adopted.

In the present state of development of official and private laboratories for bacteriological and pathological examinations there appears to be no necessity of supplementing this service by laboratories connected with pharmacies. Also, it is hardly possible so to instruct the student of pharmacy in laboratory procedure in a course of pharmacy extending over three or four years properly to equip him to make authoritative decisions on matters of such vast importance to health and life.

The Public Health Service deplores the tendency toward self-medication except of the simplest character and then for a very brief duration of time.

It is believed that a student of pharmacy would have neither the time nor facilities so to master the symptoms of disease and understand their pathology to render him competent to advise regarding their treatment, nor does it appear

to be desirable. The early symptoms of a number of diseases most fatal to man can only be recognized by one of training and experience in their diagnosis. The early recognition of such diseases and the prompt initiation of appropriate treatment offers the only hope of cure for some of them. Self-medication and counter-prescribing tend to prevent the prompt and early consultation of qualified diagnosticians. It is not expected that the druggists will discontinue the sale of proprietary remedies so long as there is a continued popular and profitable demand for them. However, in view of the increasingly strict supervision of such products by official and volunteer agencies, and the educational propaganda coupled with legislative restrictions which will eventually limit the demand for such preparations as to make them no longer a source of considerable revenue to the dispenser, it is hoped that the pharmacists of to-morrow may leave school with proper appreciation of the lack of therapeutic value of these remedies and be in position to take stock and eventually devise other means of supplementing his revenue than by the sale of nostrums.

A. PUBLIC HEALTH.[1]

I. Public Health Agencies.
(*a*) Federal; (*b*) State; (*c*) Local.

II. Information to be disseminated.
(*a*) Federal laws and regulations of Public Health Service
(*b*) State laws and regulations of Boards of Health
(*c*) Local by-laws and regulations of Boards of Health.

III. Forms of coöperation
(*a*) Dissemination of information
(*b*) Service on Boards of Health in health campaigns and movements
(*c*) Reporting communicable diseases
(*d*) Educating to report vital statistics
(*e*) Miscellaneous.

B. PERSONAL HEALTH.

I. Personal Hygiene. II. Nutrition. III. Milk.
IV. First Aid. V. Diseases other than communicable diseases covered by law.

Obligatory.

I. General Consideration of the Causes of Diseases.
II. General Consideration of the Control of Communicable Diseases.
III. Vital Statistics.
IV. Official Health Organizations—Federal and State.
V. Disinfection. VI. First Aid. VII. Nostrums.
VIII. Tuberculosis. IX. Venereal Diseases.
X. Smallpox and Vaccination. XI. Biologic Products. XII. Personal Hygiene.

Optional.

XIII. Nutrition. XIV. Typhoid Fever. XV. Diphtheria.
XVI. Scarlet Fever. XVII. Milk and Its Products in Relation to Health.

[1] NOTE: The outline of the course is from "Basic Material for a Pharmaceutical Curriculum" wherein it is cited: "The information to be taught in a pharmacy course was prepared on the basis of expert opinion by the U. S. Public Health Service. The outline of a course which follows is in the exact form in which it was submitted by the Surgeon General's office."
—E. G. E.

For many years the colleges of pharmacy have begun the teaching of pharmacy in the freshman year. This was due to our short course, making it necessary to introduce pharmacy as soon as the student entered the college. The question has been debated many times as to whether it would not be better for the student to have had a year of chemistry and physics before being introduced to the subject of pharmacy. When our four-year courses become operative, such a procedure will be possible. At present, however, it would seem necessary to introduce pharmacy in the freshman year. The following paper by Professor Shkolnik treats of the application of chemistry to pharmacy and is worthy of careful consideration by all teachers of pharmacy.—C. B. JORDAN, *Editor*.

SHOULD CHEMICAL REACTIONS BE STRESSED IN TEACHING PHARMACY?

BY SAMUEL SHKOLNIK.*

We are all aware of the fact that the nature of the various courses taught in a College of Pharmacy is such that they do overlap one another, and that no sharp line of demarcation can be drawn between them. Quite frequently, therefore, it becomes necessary to discuss chemical reactions in connection with the subject of Pharmacy as such, particularly in the Pharmacy Laboratory, if we desire students to understand what they are doing. I shall confine myself in this article to the discussion of the "propriety of stressing chemical reactions in the Pharmaceutical Laboratory rather than leaving it entirely to the Chemistry Department wherein the subject of Chemistry is studied as such."

Let us picture outselves in a Pharmacy Laboratory giving instruction to a group of students on the preparation of the popular solution—"Lime Water." If it be contended that chemical reactions are not to be stressed in this laboratory, what would be the nature of the instruction? Undoubtedly the method as outlined in the U. S. P. would be presented, the materials necessary for its manufacture distributed, and the instructor with his grade book and pencil in his hand would pass back and forth through the aisles of the laboratory to see that the solution is properly put up and that all rules of technique are observed. Most of us know that this method would be very unsatisfactory, for the students, though given detailed information in the U. S. P. regarding the manufacture of this preparation, and its storage, will not, or cannot, or both, correlate the various points for themselves and cannot, intelligently discuss either its composition, nature or method of storage.

I have tried it and have had that very experience. They weigh out the directed ingredients and follow the directed procedure without knowing what they are doing or why they are doing it, notwithstanding that they have covered in the Chemistry Department the study of the alkaline earth metals and their compounds. Now, why? Because, while reading the directions from the U. S. P. the average student sees before him only nothing more than a group of words; he does not seem to be able to use his knowledge of elementary chemistry (and that is all the chemistry involved here) which, as I said before, at the time of the manufacturing of this preparation he has already had, or at least has been exposed to. A question like this—"Why was the Official Latin title of this solution changed from Liquor Calcis to that of Liquor Calcii Hydroxidi"—is almost unanimously proclaimed by

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them as a *sticker* or *catch question*, or the like—they are not jealous of phraseology. To put it very mildly is to say that we are crediting them with too much intelligence when we expect them to use their chemistry knowledge and be able to apply it to pharmaceutical operations without further pointing out to them the chemical reactions involved in such operations at the time they take place.

Now let us picture ourselves in the same laboratory with the same group of students about to manufacture the same preparation. At this time let us have the instructor point out and stress the chemical reactions involved and write the equations representing same. The students are not given to understand that the reason why they are directed to slake the lime with a little warm distilled water is, not because the U. S. P. says so, but because warm distilled water facilitates the conversion of calcium oxide (Lime) to calcium hydroxide as represented by the following equation—$CaO + H_2O = Ca(OH)_2$—which is the compound in the finished product. This explanation helps them retain the fact that the finished product is nothing more than calcium hydroxide dissolved in water and then the question regarding the change in title, referred to above, ceases to be unanswerable. Let us also tell them, that the preparation should be stored in "well-filled, tightly-stoppered bottles," again, not because the U. S. P. says so, but because carbon dioxide is a constituent of the air and the stratum of air immediately above the solution, in a partially filled or unstoppered bottle, brings sufficient carbon dioxide in contact with the solution to convert, at least some of the calcium hydroxide, to calcium carbonate which, being insoluble, precipitates out, as represented by the following equation—$Ca(OH)_2 + CO_2 = CaCO_3 + H_2O$—thus decreasing the strength of the preparation. This information in turn enables the students to understand why the solution turns cloudy on standing and what effect such turbidity has on the strength of the preparation.

Referring to its use in the manufacture of Linimentum Calcis, let the students be told at this time about its function in the latter preparation—that its alkalinity tends to saponify, partially at least, the linseed oil used therein and change it into a calcium soap. If, therefore, the lime water turns turbid on standing it should not be used in the manufacture of Linimentum Calcis, for the turbidity indicates that some of the calcium hydroxide, if not all, was precipitated as calcium carbonate and its alkalinity correspondingly decreased or completely removed.

It is true that this method of instruction means repetition of what they have already had in the Chemistry Department, but I found in my experience that, as far as making students get and retain information is concerned, nothing can take the place of repetition. This repetition has a double effect. It not only gives them an intelligent understanding about the Pharmaceutical Preparations that they are manufacturing but it also tends to crystallize in their minds many principles of General Chemistry. For example, they have learned in general chemistry that calcium is a metal and that oxides of metals form bases when in contact with water. They have also learned that carbon dioxide bubbled into Lime Water produces calcium carbonate, a precipitate, and that an excess of carbon dioxide redissolves the precipitate by forming calcium bicarbonate which is soluble. In fact they have carried out such experiments in the Chemistry Laboratory and yet, when the same principles are now presented to them in the Pharmacy Laboratory, they do not seem to be able to put two and two together. When they studied

this subject matter in the Department of Chemistry, the term "Lime Water" did not mean to them a definite pharmaceutical preparation, but only another one of the many "stuffs" used in testing. Their study there was more of an abstract nature and as such was not lasting; there was nothing concrete for them to retain.

I have used lime water in this discussion because it involves very simple chemical reactions and yet affords a good example of the need for stressing chemical reactions in the Pharmacy Laboratory. Of course, numerous other examples could be cited in which the chemical reactions are more complicated, but these cases would only serve to emphasize the reason for stressing chemical reactions in Pharmacy. I shall, therefore, not practice what I preach, for I do not wish to bore you with repetition.

CONCLUSION.

During the past five years as a teacher in the Pharmacy Laboratory at the University of Illinois School of Pharmacy I have tried both methods of presenting the work and have come to the conclusion that chemical reactions must be stressed in the Pharmacy Laboratory. I have found that by so doing the students can thoroughly understand and explain what chemical reactions take place in the manufacture of the preparations they make, what the composition and nature of the finished product is and in what manner it should be preserved. This makes the exercise more interesting for them and creates in them a confidence in their ability to manufacture preparations and do it properly. Aside from the fact that a thorough knowledge of this kind is symbolic of an educated pharmacist and distinguishes him from the many so-called pharmacists, what, may I ask, is more essential to intelligently practice Pharmacy than a knowledge of the nature and composition of the products to be used? According to my observations, and I think you will agree with me, that stressing chemical reactions in the Pharmacy Laboratory contributes materially toward such knowledge.

MEDICAL AND PHARMACEUTICAL STUDIES IN CHINA.

The Dojinkai has recently decided to establish the following enterprises in China:

1. Health administrative organ: Establishment of a central health department and a local health bureau, the organization of medical corps in all garrisoning armies, and the establishment of the army and navy quarantine.
2. Medical and pharmaceutical educational institutions, relating to medical and pharmaceutical colleges in all provinces.
3. Medical treatment organ: Organization of hospitals and their personnel.
4. Medical bodies: Physicians' organizations both native and foreign, and other phases.
5. Regarding the Dispensaries: Their conditions, business and associations and their rules, with a geographical distribution of prepared medicines.
6. Medical materials, cultivation of poppies, the demand and supply of opium; ginseng, camphor and other materials.
7. Regarding diseases: small-pox vaccination, demand for serum, statistics on regional diseases, treatment of insane.
8. Other status on medicine and health.

Prepare for Pharmacy Week—October 12th—19th.

THE SCOPE OF MATERIA MEDICA TEACHING IN THE PHARMACY SCHOOL.*

BY H. H. RUSBY.

In the presentation to students of the sciences which are basic to pharmacy, such as botany, chemistry and physiology, there need be little fear of carrying the work too far, since the more information and the better the understanding of such subjects, the better equipped is the student to profit by his instruction in the subsequent departments of pharmacy, materia medica and toxicology. With the latter subjects, especially materia medica, the situation is quite different. The student's knowledge of materia medica is gained for the express purpose of qualifying him as a pharmacist, to prepare, handle and dispense the articles of the materia medica. If there is a certain drug that is not in use and not called for, however interesting it may be from a scientific standpoint, there is obviously no demand or requirement for the pharmacist to be informed concerning it. If the field of materia medica were so limited that it could be covered in the ordinary pharmacy curriculum, it might be desirable to treat the subject in a very comprehensive way, but it is, in fact, so extensive as to render it necessary to limit the time and attention that are bestowed upon it. Thus the question before us becomes "What principles are to be applied, and what rules are to be adopted in deciding what portion of the entire field of drugs is to be covered in the materia medica course of the pharmacy curriculum?" The same question thus applied in the selection of the articles to be studied, must also be applied to the features of these drugs which should command our attention.

So far as the selection of drugs is concerned, it may be said that the therapeutic value of an article, provided it is in demand, should have little weight with the pharmacist, though of prime importance to the physician. When a pharmacist supplies a drug or its preparation, his obligation as to identity, purity and quality is not modified by the relative therapeutic value of the article concerned, so that we may begin with the general principle that the materia medica syllabus should include every drug that the pharmacist is likely to be called upon to sell or dispense, and if it is not practicable for all these to be included, the order of their importance is to be determined by the extent of their use. This would seem to indicate at least some knowledge of practically all the drugs of the Pharmacopœia and Formulary, but the extent and character of this knowledge should be determined by the nature of the relations of the pharmacist to the respective articles. There are innumerable facts relating to the origin, history and relations of drugs, a knowledge of which will rarely, if ever, be called for in the pharmacy, and it seems unreasonable that the student should be burdened with the labor of memorizing them, in ordinary cases. He should, however, be thoroughly instructed concerning the literature of such subjects, in order that he may be able to refer quickly to the proper source of such information. There are, therefore, perhaps a dozen works besides the Pharmacopœia and the Formulary in the scope and use of which the student should be instructed.

In the matter of pharmacognosy, it would appear to be superfluous labor for the student to learn the identity and physical characteristics, especially micro-

* Section on Education and Legislation, A. PH. A., Baltimore meeting, 1930.

scopical, of a large number of drugs that he is practically certain never to encounter in the crude condition. He should, however, know just where to turn for such information, if required, and his knowledge of descriptive terminology and of methods of examination should be so thorough as to enable him to use quickly and accurately the printed description and the instruments employed in his examination. With this information and a thorough training in methods of examining the different types of drugs, the student may reasonably be relieved of an immense amount of detailed study in pharmacognosy, without material detriment to his pharmaceutical fitness and ability. At the same time, he is fully equipped for consulting and using the necessary sources of information when the occasion arises.

In the matter of adulterants, impurities and imperfections of drugs, the pharmacist should be well informed, even though the crude drug may not come under his direct observation, for the reason that such conditions affect the quality of the preparations that he is called upon to dispense, and for this, he cannot escape responsibility if such preparations are made from defective drugs. I should say, therefore, that all important facts relating to the quality of drugs should receive full treatment in the pharmaceutical materia medica course.

Since facts of incompatibility and solubility determine all the processes of the pharmacy, as to both manufacture and dispensing, the general nature of the composition of all drugs, the preparations of which are handled in the pharmacy, is of prime importance. This statement relates, of course, only to the general character of such constituents; as to their being resins, volatile oils, fats, glucosides, alkaloids, etc., but in the matter of important active constituents, the case is quite different. Such constituents should be well studied, as to specific solubility, location in the drug, chemical association, standard amount and stability. When a legal standard of percentage exists, the student should be required to memorize the same accurately, and he should be thoroughly familiar with the liability of the drug to vary in this particular.

In the case of inorganic chemicals, although the principal facts relate to chemistry and pharmacy instruction, yet the purity rubric should be accurately known by every student appearing for his final examination in materia medica, or appearing before the Board of Pharmacy.

It goes without saying that every pharmacist should be familiar with the principal preparations of all drugs in common use and with their dosage, but in the matter of dosage, I would not hold the student to a knowledge of the exact figure, except in special cases. Far rather would I have him know something of the admissible range of dosage in ordinary cases.

All the classes of information to which I have referred relate to the drug itself, as an article or a substance, and without reference to its active properties and uses. It seems scarcely practicable to reduce the indications to which I have alluded to the form of lists of drugs to which these several indications apply. The most that we can do in such a discussion as the present, is to agree on certain principles for guidance and certain general rules based thereon. Considerable difference of opinion must always exist among teachers as to the application of these principles to individual drugs, and it is well that this should be so. In the textbook that has recently appeared under my partial authorship, we have gone much farther in these directions with many drugs than we would go with our classes. In other

words, the contents of that book are much more extensive that we should expect any teacher to require of an undergraduate class. This course was followed partly with the object of affording ample references, and partly to allow scope for individual selection by the teacher.

Coming to the subject of actions and uses, I find it far more difficult to determine on a course of action. It is quite clear that all poisonous drugs should be thoroughly studied as to mode and danger of occurrence of poisoning, medicinal and toxic dosage, conditions favoring a toxic effect, mode of action and the antidotal indications and treatment. The object of this thorough study of poisons is not only to qualify the pharmacist to administer emergency treatment, but to make him alertly intelligent in his estimates of danger in the prescriptions coming to him.

In regard to the ordinary medicinal action and uses of non-toxic drugs, the principle on which I act is that this is one of the subjects that the pharmacist should *know something about*, on general principles, but that he should not *know* these subjects as he does those with which he must have active professional dealings. My own practice has been, therefore, to go very thoroughly into the classification of medicines, based on their physiological action, and teach with the utmost possible clearness the general nature of both primary and secondary effects. Having thus referred the respective drugs to their therapeutical classes, the teacher is at liberty to go as far as he chooses in discussing the individual peculiarities of the several drugs.

In the matter of the biological serums, vaccines, antitoxins and similar products, where the pharmacist has nothing to do with preparation or compounding, there seems to be little absolute necessity for other information than that of storage, preservation and commercial handling, although the subject is one of great interest.

From what I have said on the subject of therapeutics, it will be inferred that the subject of experimental pharmaco-dynamics, or pharmacology as it is still called by many, is not, in my opinion, a subject for the pharmacy school.

TREND OF LEGISLATION AS INDICATED BY THE COURTS.*

BY ROBERT L. SWAIN.

While legislation is frequently the basis of decisions by the courts, it is also true that the decisions of the courts are frequently the basis of legislation. Many laws have been enacted to meet objections or to remedy conditions pointed out by the courts. Many have also been passed to set aside judicial opinion. Much of our law is Case law, so called because it to is be found in the adjudicated cases. So important is this branch or repository of the law that one of the great classifications of the law divides the subject into Statutory and Case Law. Case law is of the greatest significance to subsequent legislation. Knowing what the courts have said regarding the application of a principle to a factual situation, legislation may be more easily framed to meet the judicial view or to avoid the conditions which have not been approved. Case law is a very dependable source of statutory law.

* Section on Education and Legislation, A. PH. A., Baltimore meeting, 1930.

There is now a well-directed movement to render uniform the law of the several states regulating certain social and business relationships. This work is in the hands of eminent legal scholars, and is designed to simplify and restate the law. The uniform partnership act is a case in point. The opinions of the courts of the several states dealing with the relationship created by partnership were carefully compiled and legislation drawn to give effect in all of the states to what was established as the majority view. The law of partnerships has been passed in many states, thus making uniform this branch of legal procedure. This one illustration will serve to point out the importance of case law to statutory law.

This subject is of great importance to pharmacy. Pharmacy laws have been before the courts in most of the states. The courts have upheld all of a certain kind, many of another kind, and have expressed themselves very forcibly regarding certain defective provisions. It has been the evident desire of the courts to uphold these laws even in those cases where the language of the act made it impossible to do so. From the very outset the courts have recognized the public health value of pharmacy and have sought to make effective the protection which the pharmacy laws contemplate. So far as I have been able to learn the courts have, in every instance, upheld the provisions prescribing educational, professional and technical qualifications for pharmaceutical registration. Some of the most profound appreciations of the significance of pharmacy to the public welfare is to be found in the opinions of the courts. This same appreciation of the service which pharmacy renders persists in those decisions in which the court is compelled to invalidate the law. For instance, in the case of South Dakota *vs.* Wood, decided on October 11, 1927, which involved the legality of restricting the sale of patent and proprietary medicines to pharmacists, the court made the following statement: "A police regulation for the protection of the public health will be sustained, if by any fair construction it has a tendency to effect its object. We have, therefore, sought earnestly for a valid reason to sustain the law, and to that end have considered the reasons advanced in the briefs of the appellant, and have searched the statutes and the reported cases for a valid reason." There is a marked uniformity in the opinions of the courts regarding the fundamental aspects of pharmaceutical service. The different conclusions which have been reached in different jurisdictions are not so much different in the principles recognized as in the manner in which the principles have been applied.

In the early case of State *vs.* Donaldson, decided in Minnesota June 18, 1889, reported in 42 N. W. 781, the court said: "Undoubtedly the state has as much right to regulate the sale of patent medicines as any other; and, in the exercise of that power, may adopt any measures they see fit, provided only they adopt such as would have some tendency to accomplish the desired end, to wit, the protection of the lives and health of the public. This is the extent and limit of their power. But, because it was deemed either impracticable or unnecessary to regulate the sale of patent or proprietary medicines, of the acts of nearly thirty states or territories regulating the paactice of pharmacy (all so nearly alike as to suggest a common source) which we have examined, every one, unless ours be an exception, expressly excepts the sale of patent or proprietary medicines from its operation. Probably, the reason is that merely to limit their sale to pharmacists would furnish no protection to the public, without some further regulation as to inspection or analysis

that would tend to exclude from sale those that might be injurious to health, or something requiring pharmacists to exercise their skill and science in determining the quality and properties of such as they sold. If we turn to our statute we find an entire absence of any such provisions." Later the court added: "Had the act made pharmacists responsible for their quality, this might have had some tendency to protect the public." This case is a leading case, and may still be accepted as a sound statement of the law. The principle is well established that so long as the pharmacist does not analyze patent or proprietary medicines so as to satisfy himself of their value, so long as the sale does not require the exercise of skill or professional judgment, and so long as the sale is not otherwise regulated or controlled, there can be no restrictions legally imposed upon the sale of such commodities.

A different view has been expressed in several instances, especially in the sale of domestic remedies. In the well-known case of State Board *vs.* Mathews, decided January 25, 1910, in New York, the court said: "There are strong reasons relative to the public welfare which make it proper that regulations concerning the sale of drugs and medicines should not be confined to poisons, but may be extended so as to embrace what are known as harmless household remedies, *i. e.*, which may be harmless if properly prepared. The injury to the public health which might ensue if such medicines were carelessly or ignorantly compounded so as to contain deleterious ingredients, or deceptively, so as to be something different from what they purported to be, is manifest. The police power logically extends to such medicines no less than to poisons and other lethal medicinal agents."

The relationship of pharmacy to public health and the individual responsibility attaching to pharmaceutical practice is very clearly set out in the case of State *vs.* Zotalis, decided July 8, 1927, in Minnesota and reported in 214 N. W. 766. The statute before the court prohibited dealers located less than two miles from a pharmacy from selling certain drugs, including aspirin. The court upheld the law saying: "The statute should be sustained, if enacted, with reasonable reference to public health or welfare. If intended merely to give a monopoly to pharmacists or druggists by restricting sales to them, it is not sustainable. It is sustainable only as a police measure.

"The legislature thought that the dangers incident to its sale justified regulation and that a restriction of sales to pharmacists or to those under their supervision was effective. It is true that no technical skill is required in making a sale. This does not prove the statute invalid. As remarked by the trial court, the pharmacist knows where to procure a pure and genuine article and his prescribing physician will require him to furnish a pure drug."

Another question was presented by the facts before the California court, decided February 15, 1929, and reported as Ex-parte Gray, 274 P. 974. The law in question prohibited dealers less than a specified distance from a pharmacy from selling domestic remedies in the manufacturer's original package. In the opinion of the court there is a health question involved. The court said: "A police regulation for the protection of the public health will be sustained if, by any fair construction, it has a tendency to effect its object. All of the authorities recognize that the state has as much right to regulate the sale of domestic remedies in the original package of the manufacturer as it has to regulate the sale of any other kind of medicines and remedies. The mere fact that such medicines and remedies

are usually put in sealed packages or containers, with directions as to their use, should not alone be sufficient to remove them from the realm of regulation. A person purchasing such original package medicines might well rely, as it is intended that he should rely, upon such directions and administer the medicine accordingly, and, while the directions upon any particular original package medicine might be, and probably are, correct and safe, medicines of a dangerous character might be put up and sold in the same manner, with directions not safe, and not approved by a pharmacist, and thus the statutory province of the pharmacist be usurped to the detriment of the public."

In a very recent case, a Nebraska statute prohibiting any person other than a registered pharmacist from selling any item recognized in the United States Pharmacopœia or National Formulary was held invalid. This decision was in the case of State *vs.* Geest, decided June 4, 1929. This is one of the most important decisions in the field of pharmaceutical jurisprudence. It very closely points out that the law failed because of unreasonable and unjustifiable restrictions. It was in no case an abatement of the principle heretofore recognized. In fact, it may be that the decision states the principle even more forcibly than preceding cases. The following is from the opinion by the court: "The provision, conferring on licensed pharmacists, the exclusive right to sell any of the articles listed in the United States Pharmacopœia and National Formulary must stand or fall in its entirety.

"It will not do to say that because the legislature *intended* to promote the public health, safety, and welfare by the legislation in question and that the sale of poisonous, harmful, or deleterious drugs or medicines should be restricted to licensed pharmacists, we should, therefore, hold the act valid . . . . We think no one will contend that it would be within the scope of the police power if the act purported to restrict to licensed pharmacists the sale of sugar, coffee, tea, or dairy products. If the act were so framed that we could eliminate from its operation those articles that are useful and harmless, and leave it in force as to those articles when the public safety or health would be promoted, or calculated to be promoted, by restricting their sale to registered pharmacists, we would gladly do so. As the act is framed, however, we cannot differentiate and separate one class from another. That is a legislative and not a judicial function.

"We are constrained to hold that in so far as the act limits to licensed pharmacists the sale of all articles listed in the United States Pharmacopœia or National Formulary, it transcends the police power and is therefore invalid."

It will be noted that all of the cases predicate the validity of pharmacy laws upon the police power of the state. This police power has been defined by the Supreme Court of the United States as "one of the most essential of powers, at times the most insistent and always one of the least limitable of the powers of government." It is the authority for the laws, rules and regulations promoting public health, morals, safety, convenience and general welfare. Broad and extensive as the doctrine is, it is exercisable only within the constitutional limits. Thus while "the police power embraces the protecting of the lives, health and property of citizens, the maintenance of good order and the preservation of good morals" (Patterson *vs.* Kentucky 97 U. S. 501), the legislature cannot "under pretense of making police regulations . . .enact laws unnecessary to the preservation

of the health and safety of the community, or which prohibit that which is harmless in itself, or command that to be done which does not tend to promote the health, safety and welfare of society" (Toledo, W. & W. R. Co. *vs.* Jacksonville, 67 Ill. 37). "The legislature cannot, under the guise of police regulations, arbitrarily invade personal rights or private property" (Chicago, B. & O. Co. *vs.* State, 47 Neb. 549). "A statute which unjustly discriminates against one class of citizens in favor of another, or attempts to create a distinction as to their property or personal rights, not founded on sound reason, is invalid, unconstitutional and void" (State *vs.* Donaldson, 41 Minn. 74).

A study of these decisions and the points of law emphasized will be profitable. While these are but a few of the opinions available, they are the most recent and are valuable as reflecting current opinion. A summary of the law will embrace the following:

Pharmacy is a public health calling and is based on a valid conception of the police power; laws restricting household remedies to registered pharmacists will be upheld; laws prohibiting dealers other than registered pharmacists from selling certain types of medicines are valid and reasonable; laws imposing restrictions and regulations affecting the public health, or tending to affect the public health will be sustained; the necessity of carefully correlating restrictions with valid purposes must be observed.

As the educational, professional and technical requirements have been universally upheld, it would seem that the directions in which legislation is to proceed is fairly well indicated. The profession may feel secure in advancing the qualifications for registration to a satisfactory basis. It can still further control the sale and distribution of drugs and medicines if this is approached from the standpoint of public interest. It is only essential that the law shall be so worked out as to exercise a real public function. A wise policy on the part of the profession, based on an intelligent grasp of the facts and principles involved, would seem assured legislative and judicial approval.

The chief purposes of this paper are to emphasize the fundamental legal conceptions underlying pharmacy laws and to mention some of the salient points crystallized in the opinions of the courts interpreting them. No attempt has been made to cover the field other than to venture the opinion that the courts do have the disposition to interpret pharmacy in the terms of its public value. A further purpose was to suggest that the adjudicated cases should be made the basis for all subsequent pharmaceutical legislation. It is certainly obvious that the judicial view has become expressive of modern day demands. As the standing of pharmacy progresses it would seem reasonable to forecast that the courts would uphold statutory provisions which, under an older order, might not have been sustained. It is my view that as the professional status of pharmacy becomes more impressed upon the public mind, legislation more in keeping with this development will be enacted and will be sustained by the courts. This tendency is already apparent in the law as established by the adjudicated cases.

The 79th annual meeting of the AMERICAN PHARMACEUTICAL ASSOCIATION will be held in Miami, Fla., during the week of July 28th, 1931.

THE NEED FOR UNIFORMITY IN LEGAL REQUIREMENTS FOR REGISTRATION AS PHARMACIST.*

BY H. C. CHRISTENSEN.[1]

Chairman Jenkins heard a paper that I read before the Joint Meeting of the Boards and Colleges of District 2 in March, and requested me to read that paper to you at this meeting of the Section on Education and Legislation. However, I explained that inasmuch as the paper read to District 2 dealt, primarily, with the problems in legislation and board interpretations in that district, it would not be appropriate for this body, but promised to re-write the same to apply to the country as a whole, which I have done.

There might be any number of reasons given for the need of uniformity, but the position I am taking is with regard to its relation to reciprocity in pharmaceutical licensure. Also, the term "legal requirements" might be limited to the pharmacy law provisions, but I am using it in the larger sense and including board rulings, regulations, opinions, etc., which are necessary in the interpretation of the requirements of the law.

The National Association of Boards of Pharmacy in the very beginning of its existence faced the fact that there was great variation in the pharmacy laws of the different states. A method of reciprocity had to be established which would permit the registration of competent pharmacists of other states, and yet prevent those in training in the home state from going elsewhere to register, where the qualifying entrance requirements appeared to be more attractive to the applicant and then, later, using such registration as a basis for reciprocity with the home state—commonly termed "evasion."

To circumvent this, the following basic rule for reciprocity was adopted: "The applicant must have had the legal qualifications at the time of registration in the state *from* which he applies which would *at that time* have enabled him to qualify for examination and registration in the state *to* which he is applying for reciprocal registration."

Keep in mind that this is a National Association of Boards of Pharmacy ruling. The laws of only a few states contain it as a part of the reciprocity clause. Its principal merit is that it makes reciprocity possible without infringing on states' rights, as the qualifications of the *individual* are made the basis for reciprocity. Making the requirements of the *state* the basis for reciprocity is not practical, as scarcely any two states have exactly the same requirements. While some reciprocity clauses in state laws read "equivalent standard of registration," with only one or two exceptions, the boards interpret this to mean the standards in effect *at the time when the applicant originally registered* which, liberally interpreted, is practically the same as the basis of the qualifications of the applicant, namely, the basic rule.

The greatest variation at present in examination entrance requirements in pharmacy is in the amount of practical experience specified. Originally, four years of practical experience was the generally accepted basis and a majority of the laws are still figured on that basis.

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* Read before Section on Education & Legislation, A. PH. A., Baltimore meeting, 1930.

[1] Secretary, N. A. B. P., 130 No. Wells St., Chicago, Ill.

Much of the variation as it now exists is due to different methods of computing and crediting college time. Some states give a flat credit of one calendar year for each term in college, others eight months, still others nine months. During the two-year course, this variation was not so noticeable but when figured on the three-year basis, difficulties arise. For example: Iowa, Nebraska, Ohio and several other states give a full calendar year credit for college time. In other words, the candidate for examination must qualify with one year of experience in addition to graduation from the three-year course. The majority of states give a credit of nine months for each college term, or twenty-seven months for the three-year course, thus making the experience requirement twenty-one months. However, in a number of states the law specifies that the minimum of experience required in addition to college shall be two years. New Jersey, and possibly a few other states, only give eight months credit for the college term. In such cases, the two-year minimum also applies.

From this it can be seen that a registrant of Iowa, for example, who is a three-year graduate and at the time of registration had only one year of practical experience, will be barred from reciprocal registration in Illinois, New Jersey and these other states which require a minimum of two years of experience, as he does not comply with the requirements of the basic rule, namely, he did not have enough experience to be eligible to sit in examination in New Jersey, Illinois, etc., on the day when he took and passed the Iowa examination.

The District of Columbia and Pennsylvania have laws which specify a minimum of three years of experience, in addition to college graduation. In the case of the District, however, the proviso in the law permits the board to use its discretionary power in giving credit on the experience requirement for college *attendance* (not experience concurrent with college) and thus there has been no difficulty on reciprocity.

Pennsylvania has a similar *three*-year experience requirement in addition to college graduation. Yet, strange as it may seem, Pennsylvania registrants have been refused reciprocal registration in Illinois and other states, for insufficient prior experience, where the requirement is a minimum of *two* years of experience. The difficulty is that Pennsylvania gives credit for experience concurrent with school time, and no other state will recognize such experience.

Most states require a four-year training period, giving credit thereon for college attendance as previously explained; therefore, allowing college credit and experience credit concurrently would be giving double credit for such months. The Pennsylvania law, however, does not specify a four-year training period as do most other states, but prescribes the three years of experience in addition to college graduation, thus separating the experience and schooling, with no credit for college attendance. The board, however, allows four months of credit for part-time experience during the college term and four months of credit for full time experience during vacations. This gives eight months of credit, which only has a value of three months in those states on the flat four-year training period, inasmuch as the maximum credit there would be three months for vacation, as nine months has already been allowed for college attendance one term—thus Pennsylvania credits five months in each of these years which other states cannot count. In other words, at the end of the three-year course, such Pennsylvania

applicant has fifteen months of experience which does not count elsewhere. Deducting this from the thirty-six months required by Pennsylvania leaves only twenty-one months of actual full time experience recognized by other states. It has already been called to your attention that twenty-four months is the prevalent experience minimum, on which the Pennsylvania applicant falls three months short. And, paradoxical as it may seem, Illinois registrants have been denied reciprocity in Pennsylvania because of insufficient prior experience. This also applies to other states on a four-year training basis with a two-year minimum experience requirement. These registrants can show two years of full-time experience, but as many of them did not work during the college term, Pennsylvania cannot give them any credit for college attendance inasmuch as its law distinctly separates college graduation from experience. Such applicants are short one year, as Pennsylvania requires three years of experience in addition to graduation.

This is about the best example I can give of a law entirely satisfactory in all respects within the borders of a state, yet creating difficulties for the registrants of that state when they desire registration elsewhere. It shows the necessity for uniformity in legislation. The board of pharmacy can do nothing to alter this injustice as long as it remains in the law, inasmuch as it is the duty of the board to enforce the law as it is written.

Also, the provision in the laws of Georgia, Mississippi, Virginia and one or two other states, which admits college graduates to examination without any prior experience is out of line. Such registrants would be barred reciprocally from all states that require any experience in addition to college. In Virginia, the board advises candidates for examination to this effect and thus alleviates the condition somewhat.

The word picture I have given is rather gloomy. However, there is a brighter side which should, in fairness, be stated. A large majority of the candidates who register have *more* than the minimum experience required by the state in which they register, and thus the reciprocal difficulty is cut down somewhat.

There are also inconsistencies in other matters that have relation to practical experience. For example, some states count experience after the fifteenth birthday, others after the sixteenth, and still others have no definite age limit. This presents complications. Some states require that a minimum of one year of the experience must be in the United States; others two years. Some states credit time in an approved hospital, others give credit for a limited amount, such as one or two years, others give no recognition. Some give credit for Army and Navy experience in pharmacy; others do not. When these minor details are not written into the law but are left to the board to rule upon, they can readily be changed to conform with the prevailing rule in the majority of cases. However, in too many states these details are specified in the law, and all that the board can do is to abide by them until the law is amended. Proposing an amendment is sometimes risky business, as it permits opposing factions in the legislature to put through other amendments, which may do great harm to the law.

There is also need for uniformity in other matters besides the practical experience requirement. A few boards still are compelled to admit candidates to examination at the age of eighteen on account of the law of the state, the prevailing requirement being twenty-one years of age. Such candidates are barred

under the basic rule, inasmuch as they were not eligible for examination in the recipient state on account of age. This does not apply, however, when the board examines in written subjects only, and withholds issuance of license until the practical examination has been given and all requirements fulfilled.

The dating of diplomas and licenses also causes friction and frequent rejection of reciprocal applicants. Boards, in order to accommodate graduating classes often give the examination before the formal graduation exercises when the diploma is awarded. In such cases, the state license should be issued as of a date subsequent to the diploma date. If dated prior to the diploma, the candidate is not technically and legally a graduate. He can be denied reciprocity under some laws, because he was not a graduate on the date when the original license was issued him. If the boards and the colleges will pay particular attention to this point, much difficulty can be avoided.

College and board members, state legislative committees, and pharmacists generally, in their zeal for new laws and amendments often overlook the importance of keeping the same more or less uniform with respect to other states. Each group naturally concentrates on its particular interest and sometimes overlooks the general welfare of registrants as pertains to reciprocity. Colleges sometimes have more influence than board members in securing the passage of new legislation. And since there are college representatives present at this meeting, let me ask them to assist us in this work. A number of state laws plainly show the zeal of the colleges in working for the prerequisite, which is commendable, but the laxity in writing the experience requirement, or omitting it entirely, means many hardships in later years for graduates who seek reciprocal registration. While many of the colleges may doubt the efficacy of the experience requirement, until such time as the movement to discontinue it is general, its omission from a law will work more hardship than good. The college should assist in making it possible for its graduates to practice in as large a field as possible. Reciprocity is by now an institution which should be protected in all laws. There is a recommended standard of requirements which years of experience have proven fair and workable. Deviation therefrom causes much confusion and annoyance to registrants by curtailing their reciprocal privilege and the state gains nothing by refusing to conform on these minor details.

I believe I have set forth the need for uniformity in the legal requirements. The next question is how can we bring this about when so many conflicting laws are already on the statutes? The National Association of Boards of Pharmacy since its inception, as specified in its constitution, has had as an object "a uniform standard of pharmaceutical education and uniform legislation." Time and patience are required to accomplish this object, and keeping constantly at it. Yet when I glance through our proceedings for 1911, as I did the other day, and compare the standard in effect then with the present standard I can see how much has been accomplished. The National Association of Boards of Pharmacy did not adopt an aggressive policy on legislation until 1914, when the central office was established and a definite effort was made to render legislative assistance to all states contemplating new laws or amendments pertaining to pharmacy.

Comparing the requirements of 1911 with those of 1930 may prove interesting:

1911.	*1930.*
2 states, college graduation and experience	31 states, college graduation and experience
1 state, college graduation only	2 states, college graduation only
	3 states, college attendance and experience
5 states, 5 years' experience	1 state, 5 years' experience
31 states, 4 years' experience	8 states, 4 years' experience
10 states, 3 years' experience	4 states, 3 years' experience

Thus it may readily be seen that many changes toward uniformity have taken place, and by concerted effort, uniformity is possible. Twenty years have brought about a remarkable change. Much more along this line should be accomplished during the next ten or twenty years, if we all work for the same goal.

Right now the question we are trying to answer for the boards is, "How much experience shall be required of four-year graduates?" inasmuch as the four-year course becomes effective for matriculation in 1932. The consensus of opinion seems to be that one year is right. There is a slight division of opinion as to whether this experience shall be required as an interneship after graduation, no other experience to count, or whether merely proof of 12 months of retail pharmacy experience shall be sufficient, nine months of which can be obtained during the three summer vacations. The object of the former is to provide for pharmacy a period of interneship such as dentistry, medicine, and the other professions have. The one advantage is that it would do away with questionable experience, as affidavits present opportunity for fraud. The period of apprenticeship would be served in an approved pharmacy, recorded with the board, where prescription work is done daily and a registered pharmacist is in charge. The board would examine the candidate in the theoretical subjects immediately upon graduation, register him as an apprentice and after his year of interneship has been completed, have him return for the practical examination in compounding and then grant him a license as registered pharmacist.

Under the four-year course, a great many laws will have to be amended, as it is obviously unfair to require two or three years of experience in addition to graduation from the four-year college course. Therefore, since we are going to the legislatures to change the laws anyhow, it seems a wonderful opportunity to get all our requirements more or less uniform and in harmony.

As soon as a decision is reached on what the recommended standard shall be,[1] let me urge all of you to coöperate with us in reaching that goal in every state by the time the first classes graduate under the universal four-year course in 1936. The date seems far off but with the present legislative congestion, two or three sessions may be required in some states to enact the amendments. What a wonderful thing it would be for pharmacy if we could have every state on the four-year course basis with a uniform experience requirement by 1936, when the first class graduates. Certainly it is worth working for.

ABSTRACT OF DISCUSSION.

The author said that the candidate would have three vacation periods of three months each which would give him nine months during his four years at college. It seems a fair proposition

[1] The N. A. B. P. convention disapproved the interneship plan. Approval was given to the year of experience in addition to the four-year course, with no limit as to when experience is to be obtained.

that he be given credit for this period. It would not work a hardship on the student and the college could back up this proposal. It would be a compromise between the colleges who have advocated "no experience" and the pharmacists who want more; the pharmacists of all states should work together on this matter. In addition to college graduation there should be a "clean-cut" year of experience whether the experience is obtained prior to entering college, during vacation periods or after graduation.

John R. Minehart said that what Secretary Christensen had reported should interest everyone concerned in pharmacy. In Virginia they have done away with the experience requirements altogether. Personally he would like to have three years of experience, but there must be "give and take" and he doubted if the mortality in Virginia would be any greater without experience than if three years of experience were required. This is a matter that should be considered very seriously.

Charles T. Heller said that in Minnesota the one year of experience in addition to graduation had been adopted.

The author replied that at least eight states have changed their laws within the last two or three years.

U. S. P. AND N. F. PREPARATIONS FIT FOR BEVERAGE PURPOSES.*

BY W. BRUCE PHILIP.

Pharmacy is a good, clean profession. It is true that the responsibilities placed on the pharmacists by the Government have given to a few weak members an opportunity to forget our high ethical standards and to bring discredit on themselves. Their discredit has been felt by all of us.

The prohibition law is one of our great problems. As these laws are often made and enforced by persons not trained in pharmacy or medicine, we should watch closely the enactment and enforcement of all laws of this character.

Regulation 2, being a revision of Internal Revenue Regulation No. 60 has been effective since October 1, 1927. This regulation interprets the 18th Amendment to the Constitution of the United States and the National Prohibition Act (41 Stat. 30S). It is the Government's guide for pharmacists.

Article XI, Sec. 112—(Page 98) begins—"The U. S. P. and N. F. preparations listed below are held to be fit for beverage purposes." This list is composed of: Cordial, 9 Elixirs, 3 Spirits, 6 Tinctures and 4 Wines as follows: Blackberry Cordial, Elixir Aromatic, Elixir of Anise, Red Aromatic Elixir, Elixir of Bitter Orange, Compound Elixir of Cardamom, Elixir of Licorice, Aromatic Elixir of Glycyrrhiza, Compound Elixir of Taraxacum, Elixir of Terpin Hydrate, Spirit of Ether or Hoffmann's Drops, Compound Spirit of Juniper, Compound Spirit of Myrcia (Bay Rum), Bitter Tincture, Aromatic Tincture, Tincture Sweet Orange Peel, Tincture of Caramel, Tincture of Lemon Peel, Tincture of Ginger, Compound Wine of Orange, Wine of Beef, Wine of Pepsin and Wine of Wild Cherry.

The Tenth Revision of the U. S. Pharmacopœia has been official since January 1, 1926 and the 5th Revision of the National Formulary have been official from July 1, 1926. Both of these revisions were more than a year old before the issuance of Federal Prohibition Regulations, 2. These revisions have deleted many of these preparations, leaving only 12 preparations of the U. S. P. and N. F. fit for beverage purposes.

Why in three years, 1927–1930, this list has not been revised by the Prohibition

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* Section on Education and Legislation A. PH. A., Baltimore meeting, 1930.

Department is hard to say. Are the heads of this department ignorant, or unmindful, of these changes?

It seems to me that the Prohibition Department has not appreciated and acknowledged the effort of our revision committee. The question may be asked, Can we eliminate the 12 preparations left by making them unfit for beverage purposes and thus place us where we can demand the elimination of Section 1112 from the regulations?

The following are largely flavors, carminatives, stomachics, or bitter tonics: Elixir of Anise, Compound Elixir of Cardamom, Elixir of Licorice, Compound Elixir of Taraxacum, Bitter Tincture, Aromatic Tincture, Tincture of Sweet Orange Peel, Tincture of Ginger.

A fluidextract or a stronger preparation could, and in most instances has been prepared so that with a smaller dose or the using of a smaller quantity, the usual prescription of the physician, with his permission, of course, could be filled.

Bay Rum as an official preparation has passed out of the picture, due to the use of specially denatured alcohol. Specially denatured alcohol is now used by the commercial manufacturer of bay rum.

Spirit of ether is a simple mixture of ether and alcohol. I feel that if the purpose is sufficient, we could leave the manufacturer of this preparation to extemporaneous pharmacy, keeping the formulas in our Recipe Book.

Simple Elixir may offer, at first, a serious problem. Many feel we need a 22–24% alcoholic diluent or vehicle to preserve a prescription or to prevent precipitation. Do we? Do you know that hundreds of drug stores having no permit, are using to-day a non-alcoholic so-called simple elixir that for flavor is satisfactory for their purposes? Many of these druggists state that not only are the physicians satisfied, but the finished prescription gives satisfaction in every way. It is true they are violating the pure food and drug laws, as well as the state pharmacy law when they substitute a non-alcoholic simple elixir for the U. S. P. preparation without the doctor's permission. Can we not, if the reason is worth while, make our vehicle diluent non-alcoholic, devising a satisfactory name and formula and then have the pharmacist, whenever necessary, add enough alcohol to the prescription to make the finished preparation a correct pharmaceutical product. If you examine the elixirs of the National Formulary you will notice that a large number do not designate simple elixir, but direct the use of the proper proportion of alcohol to make the preparation.

My personal experience is that the bromides and salicylate are prescribed with a diluent that has less alcohol than simple elixir.

This leaves Elixir Terpin Hydrate. If this preparation is the only one left, the Federal Prohibition Department should consider the medical value of the preparation and exempt the preparation from any restrictions. If not, the preparation must go. Pharmacy cannot afford to be in any position where its good name and intention can be questioned. I feel that all these U. S. P. and N. F. preparations, as now made, must be revised.

It is my opinion that there are few preparations that were more useful than Tincture of Ginger. As a household preparation, it was useful as a medicine. The abuse of these preparations by dealers and the lay public is too well known to be repeated here.

We have been without Tincture of Ginger for sale over the counter or on physicians' prescriptions without liquor form 1403 for about five years. A little more peppermint or fluidextract of ginger is sold.

To conclude—let us change or eliminate these preparations, keeping all our U. S. P. and N. F. preparations unfit for beverage purposes, made and sold only as medicines.

A REVIEW OF FIVE HUNDRED PRESCRIPTIONS.*

BY A. C. TAYLOR.[1]

To determine the problems that arise in compounding, observed from a viewpoint of occurrence; to establish the value and importance of each in college training, and the developing of questions in practical pharmacy for a Board Examination.

The prescriptions were all filled during last February and do not include prescriptions for biologicals. In nearly every case biologicals were called for verbally, phoned for, or the name written on a piece of paper. I had no record of them except that which was imperfectly determined by inventory and invoices. The number sold during the same period I estimate to be 17 units. I also filled 25 liquor prescriptions during the same period. The biological group required knowledge of product, attentive and careful selection, ability to price properly, and an acquaintance with the source, method of preparation and therapeutic value. The 25 liquor prescriptions plus the 123 containing narcotics, and 4 containing chloral hydrate, which are governed by a clause in our local pharmacy law, make 152 times that the problem of possible law entanglement confronted us. That brings the total number of prescriptions under consideration to 542, which number must be considered when arriving at percentages.

It is a generally accepted idea among Board members that the function of the examining board is to find out if a candiate will be a safe person to practice pharmacy. The proprietor of the pharmacy expects that the Board of Pharmacy has determined not only that the person holding a certificate as "Registered Pharmacist" is a safe person to practice pharmacy, but that he has acquired manual dexterity and skill; that he has learned to use in a practical way, the mental knowledge acquired during his college course. He expects this man to be thoroughly capable to handle any problem that may arise during the compounding and dispensing of medicines. He expects that the Board has determined his ability to fill prescriptions and dispense medicines correctly, promptly, neatly, legally and at a profit.

Now that pharmacy has lost a most valuable aid to pharmaceutical training—the old-time apprenticeship—the colleges must give more serious attention to the training of the student in practical work; work that the graduate must immediately commence to do as soon as he becomes a registered pharmacist. The filling of prescriptions is beyond argument the dominating work in a pharmacy. To ascertain if this graduate has acquired the proper amount of dispensing skill the Board subjects him to an examination in practical work. That usually consists

* Section on Practical Pharmacy and Dispensing, A. PH. A., Baltimore meeting, 1930. No discussion.

[1] Washington, D. C.

of the filling of five or six prescriptions; so it is apparent that in the selection of prescriptions the aim is to include as many of the hundred or more possible problems, and constitutes the most significant part of the Board members' duties in connection with such an examination. It is certainly very important that the teachers in the pharmacy schools impress upon the students the necessity of considering all the problems that arise in compounding prescriptions. If we can get the student to look upon the filling of prescriptions as a scientific and outstanding procedure and not just the mixing of a few things to be put up as quickly as possible and gotten out of the way, we will have done a big thing for pharmacy.

Don't smile when I say that the first problem in the filling of any prescription is the proper way to receive a prescription from a customer. It is at this point that the confidence of the patron may be gained or lost. Notice the anxious look in the eyes of the mother who has just left her seriously sick baby. She is trying to satisfy herself that the pharmacist is a capable person to call upon to assist her, the doctor and the nurse in the fight to save the life of her precious one. To gain her confidence the pharmacist must have confidence in himself, and this faith in his own ability can only be gained through practice. It is not enough to tell a student how to do a thing of a technical nature—he must be shown how to do it. Sometime during his college course the student should compound, under intelligent and capable guidance, several hundred prescriptions of the current type. In no other way can he gain that confidence in himself which goes far in the making of a successful pharmacist. And then, again, throughout the entire college course the student should have impressed upon him the fact that in the compounding of prescriptions the pharmacist has the opportunity to render mankind a professional service of the highest type, assisting in the saving of human life. Students must be impressed with the value of this life of service, for after all that is what counts. To be a good prescriptionist the pharmacist must be sympathetic, courageous and earnest. He must have a degree of refinement and culture and meet the patrons in a way that will impress his educational and cultural training.

It is impossible for an examiner of a Board to devise any type of examination that will enable him to find out if any applicant is 75% efficient in these virtues, but the colleges can and should give a great deal of attention to the consideration of methods to impress upon the pharmacy student the importance of his position in the world.

After the pharmacist has received the prescription from the customer what are the problems he must grasp within the first few seconds and be able to act upon intelligently and without hesitancy?

1. Can the prescription be filled quickly, so that the patron may be expected to wait for it, or should the offer be made to deliver it?
2. At a glance the pharmacist must consider the legibility of the prescription.
3. Does any ambiguity occur?
4. Doses must be carefully scrutinized.
5. Care must be exercised that legal requirements have been complied with.
6. A fair and profitable price to charge for the prescription must be decided upon.

Now to get down to the problems connected with compounding. In reading the prescription the problem of deciphering illegible writing is always a trying one

and success must often be attributed solely to experience. In the prescriptions reviewed there was not much reason for complaint. Out of the 500 only two prescriptions required a knowledge of classical Latin but nearly every one required a knowledge of Latin abbreviations and contractions. One required a knowledge of a foreign language; in this case it was Polish.

I thought it might be interesting to know the frequency of each type of prescriptions; table follows:

Type.	Times.	Type.	Times.
Mixtures	206	Plasters	2
Proprietaries without admixture	101	Infusions	2
Capsules	81	Cachets	1
Preparations without admixture	20	Pastes	1
Powders	20	Collodions	1
Tablets	18		
Ointments	15		500
Percentage solutions	14	Biologicals	17
Emulsions	10	Liquor Prescriptions	25
Pills	5		
Suppositories	3	Total	542

In the filling of these 500 prescriptions we used:

U. S. P. drugs	675		
N. R. drugs	4	123 prescriptions contained narcotics	
Non-official drugs	8	Codeine	105
U. S. P. preparations	340	Morphine	18
N. F. preparations	66	Dionin	3
Non-official preparations, not proprietaries	36	Cocaine	2
Animal gland products	31	Paregoric	5
Proprietary chemicals and preparations	161	Laudanum	5
		Total	138
Total	1321		

Of the 340 U. S. P. preparations the following are comparative figures:

Tinctures	55	Liniments	20
Spirits	35	Infusions	4
Syrups	34	Mucilages	1
Extracts	26	Fluidextracts	21
Waters	29	Pills	3
Liquors	19	Magmas	8
Ointments	15		
Mixtures	20	Total	300
Elixirs	10		

Of the 66 N. F. preparations we used:

Elixirs	36	Spirits	2
Mixtures	10	Pastes	2
Ointments	5	Ampuls	1
Liniments	4		
Syrups	3	Total	66
Oleo sugars	3		

The 36 non-official preparations, not proprietary, were almost all for the D. C. Formulary Emulsion of Cod Liver Oil or as it is more commonly called Phosphatic Emulsion.

STRAINING.

The question of straining was presented 21 times.

To strain or not to strain?	5 times
Method of straining?	16 times

FILTERING.

The question of filtering was presented 32 times.

Method of filtering?	27 times
Filtration of volatile liquid	
Selection of proper funnel, etc.	
Selection of proper filtering agent.	
Proper folding of filter.	

The question of effervescence was presented 14 times. Elimination of the gas had to be considered as well as securing the stopper of the container.

The question of evaporation was considered only twice, but the use of heat was called upon twenty other times.

We had occasion to make pills only once, but that one time required a knowledge of excipients. We were called upon twice for enteric coated pills; this required knowledge of the processes in vogue and knack in doing it.

The problem of trituration arose 197 times as to proper method, proper amount, proper utensils and tools.

While tablet prescriptions were common we were able to dispense ready-made tablets in every case but one. We made tablet triturates once; this required knowledge of methods and knack.

The problem of sterilization arose 16 times, in each case in connection with eye preparations, and we were able to depend upon heat in each case.

Incompatibility had to be considered in 62 prescriptions, besides a number of times where there were apparent therapeutic incompatibilities, or the combining of therapeutic antagonists, but we consider this out of the province of the dispenser, unless dangerous.

In the majority of cases the difficulty was overcome by substitution of a different salt of the same chemical, or the addition of a solvent or preparation that would in no way change the nature of the mixture or alter its therapeutic value. It always appears to me when I encounter something unusual in the way of incompatibility, it is not a rule that gets one out of difficulties, but experience.

Order of mixing often overcomes what is thought to be an incompatible.

Only two of the 66 problems under this head were unconquerable. One, an ointment; the other a mixture that was corrected when the doctor substituted strong acid for the diluted form, as written for originally. It is important that the applicant for the position as registered pharmacist should have a knowledge of incompatibilities among the newer remedies.

Physical incompatibilities occur more often than chemical ones. The only one of a chemical nature occurred when aspirin and tincture of iron were combined with glycerin and water. The danger of precipitation of alkaloids by bromides often presents itself, but usually the prescription is dispensed as written with a sticker on the bottle, ordering "it to be well shaken." The most common incompatibility of a physical nature is the separation of a precipitate due to menstrua.

Incomplete solution is a frequent problem that only experience can cope with; to filter or not to filter represents the principal problem in this connection.

Our old friends potassium chlorate and tannic acid to be combined in powders showed up once in this group, so the problem of mixing solids that are apt to explode tallied once.

Development of excessive moisture arose as a problem 20 times.

Of the 20 ointments dispensed only 10 required extemporaneous preparation. Method and order of mixing ingredients, thorough pulverization of powdered ingredients are the problems met with in the preparation of a smooth product. In two cases the selection of the base or vehicle was left to the judgment of the dispenser. In the selection for one, the necessity of the base absorbing or carrying a large amount of liquid was the first consideration and in the other case the desire was to obtain an ointment that would be most readily absorbed. This required a knowledge of the mechanical properties and therapeutic possibilities of ointment bases.

AROMATIC ELIXIR OF GLUSIDE.*

BY CLYDE M. SNOW AND BERNARD FANTUS.

There is a need for a sweet vehicle for medicaments that would be suitable for patients suffering from *diabetes mellitus*, in whom the giving of sugar is inadvisable. The elixir of gluside of the British Codex, which has also been admitted to the "Recipe Book," is nothing more or less than a 5 per cent solution of gluside with 3 per cent of sodium bicarbonate in 12.5 per cent alcohol. It is merely a sweetener, but has no flavoring value and is obviously intended to be used in quantities of 5 to 20 minims added to fluid medicament for purposes of sweetening. Believing that physicians would welcome as delicious a preparation as the aromatic elixir, that did not contain any sugar, we addressed ourselves to the study of the development of such a preparation and offer, as result of it, the following formula.

ELIXIR GLUSIDI AROMATICUM.

Aromatic Elixir of Gluside.

Compound Spirit of Orange	0.50 cc.
Gluside	0.2 Gm.
Glycerin	20.0 cc.
Alcohol	25.0 cc.
Water, a sufficient quantity to make	100.0 cc.
Purified Talc	2.0 Gm.

As this elixir is mixable with water and alcohol in all proportions, it seems that it might also be useful for the extemporaneous preparation of an aqueous aromatic elixir by dilution of 1 part with 4 parts of water, yielding a 5 per cent alcohol fluid of delicious taste and flavor, suitable, *e. g.*, as a pleasant vehicle for medicament for a child in competition with other aqueous elixirs (N. F.), against which the criticism of poor keeping qualities has been leveled. Containing no sugar it would not only be useful in diabetes, but also in other conditions in which sugar might be objectionable, as in gastro intestinal fermentation.

This aqueous aromatic elixir would be a better vehicle for sodium or potassium bromide than the aromatic elixirs now used, as it could carry an average medicinal dose of 1 Gm. of the salt per teaspoonful, which the aromatic elixir cannot. It would also meet the dictates of economy as a good deal of the alcohol, now unnecessarily used in the form of these elixirs, could be dispensed with.

* Section on Practical Pharmacy and Dispensing, A. PH. A., Baltimore meeting, 1930.

COMMENT ON THE U. S. P. X WITH REFERENCE TO THE FORTHCOMING REVISION.*

BY F. W. NITARDY.

The actual use of the Pharmacopœia after the new revision appears always brings to mind certain conditions which appear to require attention in the next revision. There usually are certain questions of policy on which comments can be made. Various tests appear to require some correction in the light of practical experience and application. Now and then wording seems ambiguous and needs to be changed. Pharmaceutical, medical and biological research results in the perfection of new and important products which acquire wide use and therefore should be considered as additions. Certain definitions do not appear to be as definite as they might be. Changes in certain formulas appear advisable and added tests and standards suggest themselves. As the Pharmacopœial Convention will meet in Washington[1] next week to determine upon general principles to be followed in the forthcoming revision, elect a Revision Committee and authorize this committee to proceed with its work, it is appropriate that such suggestions as we may have accumulated in our respective use of the Pharmacopœia should be presented at this time so that they will come to the attention of those interested, and this paper is written to serve this particular purpose without attempting to go into great detail in connection with the individual recommendations. I have classified the items under various headings, as a matter of convenience.

(*1*) *Pharmacopœial Policy.*

Definition of the words "antiseptic" and "germicide." It would seem advisable to have the Pharmacopœia consider furnishing official definitions for the meaning of the words "antiseptic" and "germicide" together with appropriate tests to determine to what extent preparations sold for one or the other purpose have these properties and set a standard below which the products claimed to be antiseptic or germicidal should not fall.

Regular Supplements. It is believed desirable to have supplements to the Pharmacopœia issued at regular intervals. This subject is discussed in further detail in another paper.

(*2*) *Recommendations for Additions to U. S. P.*

The following preparations appear to have sufficiently wide use and have proved their therapeutic merit through such use so that they are well worthy of consideration for recognition in the U. S. P. XI.

Insulin, Ephedrine—alkaloid and salts—Sulpharsphenamine, Ovarian Hormone and Calcium Gluconate.

(*3*) *Added Tests and Standards.*

It would appear desirable for the U. S. P. XI to add a standard on vitamin D for Cod Liver Oil. Satisfactory biological assay methods for determination of vitamin D have been perfected in several laboratories and published.

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* Section on Practical Pharmacy and Dispensing, A. PH. A., Baltimore meeting, 1930.

[1] Has convened.

It would appear desirable to establish a standard for glycyrrhizin content for licorice and its preparations and furnish suitable assay method for this purpose.

The U. S. P. X gives the alcohol content range of most alcoholic preparations. However, the general method for determining alcohol content is not applicable to all preparations. It would appear advisable to give information as to how alcohol content should be determined for the several classes of preparations and special directions or precautions for those products in which the general methods will need changes.

An assay method for mercuric oxide should be given for Yellow Oxide of Mercury Ointment. Our and other laboratories have published papers on suitable assay processes.

(4) *Formula Changes.*

Tincture of Aconite U. S. P. is quite unstable. Adjustment of the p_H of the preparation to a definite point by use of a suitable amount of acid in the menstruum greatly improves the stability and it is highly desirable that a suitable change in formula to effect proper p_H of the finished product be made. Several papers giving detailed information have been published from our and other laboratories.

Ointment of Zinc Oxide seems to be entirely too stiff to be satisfactory for general use and it would seem desirable to change the paraffin content from 15 to about 5%.

Ointment of Boric Acid U. S. P. X has caused a good deal of complaint because of its color. I am not sure that even to-day the public or the professions are reconciled to the present official ointment. It may be wise to consider utilizing white wax or paraffin and white petrolatum instead of yellow wax and yellow petrolatum as a base. If the yellow ointment has been accepted it will no doubt be best to stay with it as further change would again cause confusion. The ointment of the U. S. P. IX was white and the change made in the U. S. P. X seemed a minor one from a therapeutic standpoint and proved very unpopular generally, which indicates the inadvisability of striking changes in Pharmacopœial preparations except for important reasons.

Sulphur Ointment. Benzoinated lard prescribed as a vehicle for this ointment does not make a particularly satisfactory preparation, is subject to rancidity and granulation in warm weather. It would seem that the substitution of a mixture of lanolin and white petrolatum would make a more stable and satisfactory ointment without damaging its therapeutic properties.

Fluidextract of Squill is directed to be made with diluted alcohol, and it is almost impossible to percolate squill with a menstruum of this alcoholic strength because of absorption of water by the squill from the menstruum with consequent swelling and gelatinization. A menstruum of a strong alcoholic content is much more satisfactory and appears to extract the active principles equally well.

(5) *Corrections in U. S. P. Tests.*

Arsenic Test for Bismuth Salts. The Pharmacopœia directs that Bettendorf's test be used and the general impression is that the Gutzeit test cannot be used for bismuth preparations. We have found, however, that the Gutzeit test can be used satisfactorily on bismuth salts and as it is more accurate it seems preferable.

Arsenic Test for Barium Sulphate. It has been found that the Gutzeit test is entirely satisfactory for determining arsenic and barium sulphate. In view of its greater accuracy it would appear a more desirable test.

Castor Oil. The U. S. P. X states that castor oil is only partly soluble in petroleum benzin but yields a clear liquid with an equal volume of alcohol. We have found that castor oil sometimes yields clear mixtures with certain proportions of petroleum benzin. We attribute this not so much to differences in castor oil as to differences in petroleum benzin. The reference to its solubility probably should be eliminated or petroleum benzin of very definite specifications called for.

Whisky. Under tests for identity and purity there is given one intended to show whether or not isopropyl alcohol is present. This test will not detect the presence of pure isopropyl alcohol but only such commercial varieties as are contaminated with tertiary butyl alcohol and is in fact a test for tertiary butyl alcohol rather than isopropyl alcohol. No doubt an additional test suitable for detecting isopropyl alcohol should be included.

Benzoin. Under test for identity the U. S. P. X states that one Gm. of benzoin extracted with carbon disulphide should yield a residue not exceeding $12^1/_2\%$. Benzoin yields a larger amount of residue and in fact in Siam benzoin this residue will average about 60%. It no doubt was intended that the Pharmacopœia should read "not less than" instead of "does not exceed" $12^1/_2\%$.

Alcohol Determinations. The directions given on pages 427–428 of the U. S. P. X apparently contain a typographical error in that the first sentence of the last paragraph starting on page 427 seems to be misplaced.

Rochelle Salt. According to the U. S. P. this product is alkaline to litmus paper. We generally find this material to be neutral. As the Pharmacopœia also directs that it should not be alkaline to phenolphthalein, it appears that the reference to its reaction to litmus paper is superfluous; but if it is retained it probably should say "neutral or alkaline."

Alum. There is a discrepancy in the figures given in the assay between the factor used and the amount of aluminum oxide corresponding to aluminum ammonium sulphate and aluminum potassium sulphate, respectively.

Dichloramine. The use of an indicator is omitted in the assay, which apparently is an oversight. Starch test solution gives satisfactory results.

Tincture Iron Chloride. In the test for identity there appear in the third line the words "white precipitated," etc., which should be deleted as this is evidently a misplaced fragment of a chloride identity test.

Ammonium Bromide. The solubility of this substance in alcohol as given in the U. S. P. appears incorrect.

Cod Liver Oil. The saponification and iodine value of Cod Liver Oil needs some revision. The present figures are no doubt carried over from the previous U. S. P. which recognized only the oil of cod fish livers, whereas the present Pharmacopœia recognizes oils obtained from livers from other fish of the cod family. There are slight variations in saponification and iodine values. Our records show that pure Cod Liver Oil made under our own jurisdiction from livers of known origin had saponification value as low as 186.2 and as high as 198. The iodine value for the same oils ranged from 129.4 to 149.9.

Aloe. We find that aloe does not always effervesce with nitric acid as stated.

Rhubarb. The test for Rhapontic Rhubarb does not yield satisfactory results and will not always detect this variety. The test should be changed to conform with a similar test given in the German Pharmacopœias which yields satisfactory results. Examination under ultraviolet light will also differentiate between U. S. P. and Rhapontic Rhubarb.

Tragacanth. It appears that the sodium borate test for foreign gums needs changing. No material can be found on the market which will comply with the present test.

Alcohol Soluble Extractive. Several of these determinations such as in Sumatra Benzoin should be changed so as to give proper consideration to volatile oil and moisture content.

Fluidextract of Ipecac. The assay needs revision. It cannot be operated satisfactorily without a centrifuge.

Fluidextract of Hydrastis. The assay needs revision. It cannot be operated satisfactorily without a centrifuge.

Milk of Magnesia. The test for residue in the supernatant liquid should be changed by directing the supernatant liquid to be decanted through a washed filter.

Ether and Chloroform. It would appear desirable to determine specific gravities at 15° C. on these products instead of at 25° C.

Ether. Solid potassium hydroxide has proved more satisfactory than a solution of potassium hydroxide for the aldehyde test.

Iodides. The iodate method would appear preferable to the silver nitrate method of assay.

Heavy Metal Test. The meaning of this test as it affects acids such as acetic, hydriodic, hydrochloric, etc., should be clarified.

Sodium Cacodylate. The assay should be for arsenic instead of a titration for its alkalinity.

Tincture of Cantharides. As the drug is assayed it appears that the assay of the tincture may also be desirable.

(6) *Corrections in Wording.*

Purified Talc. The U. S. P. carries a note reading "purified talc is intended only as a filtering medium and for this purpose should not be finer than a No. 100 powder" which has since been revised to read "purified talc is intended only as a filtering medium and for this purpose should not be finer than the powder which passes through a No. 80 sieve but is retained by a No. 100 sieve." It seems that this could be made clearer by saying that the powder should not be finer than a No. 100 powder nor coarser than a No. 80 powder.

Neoarsphenamine. In Paragraph 2 in the identity test the U. S. P. says "an aqueous solution of Neoarsphenamine (1:100)* * * is not precipitated by mercuric potassium iodide T. S." This statement no doubt is based on the following taken from the 1918 Public Health Report, "Mayer's reagent does not yield a precipitate until the solution has been made acid with dilute hydrochloric acid." When potassium mercuric iodide is added to the aqueous Neoarsphenamine solution a turbidity develops followed by the appearance of a precipitate. This precipitate

is not due to precipitation of Neoarsphenamine but to the reducing action of Neoarsphenamine on potassium mercuric iodide, and the wording should therefore be corrected.

(7) *The Meaning of Statements and Definitions.*

Meaning of "Completely Soluble." One frequently finds statements of this type in the U. S. P.: "One gram of boric acid dissolves completely in 10 cc. of boiling alcohol (insoluble substances)." The statement is intended to furnish a test for the presence of insoluble substances in boric acid. It is of course clear to a pharmacist that the statement means that when this test is applied boric acid should dissolve. If strictly interpreted, however, no boric acid would comply with it because all chemicals of this type will contain traces of insoluble matter which represent what is generally termed "mechanical contamination," namely, traces of dust particles. It appears desirable to so word the test that the meaning of the U. S. P. is made more clear.

Solubilities. Under description and physical appearance, the U. S. P. in many instances gives the solubility of the substances in one or more solvents. I believe it should be made clear whether these solubility statements are to be construed merely as information or whether they are to be construed as standards with which the product must comply. In a few instances (sodium salicylate) there seem to be errors in the solubility statement of the U. S. P. This may prove embarrassing if the enforcement officers of the Food and Drugs Act should interpret these statements as standards and rule that a product not corresponding to the solubility mentioned is sub-standard.

Terms Used for Expressing Temperature. The U. S. P. IX defined terms of temperature in degrees C. but the present Pharmacopœia does not indicate what is meant by such terms as "hot," "warm," "luke warm," etc. It appears desirable that such terms should be avoided and definite temperatures substituted or that such terms be defined.

I want to make clear that the above comments represent an accumulation of notes made during the four years that the U. S. P. X has been official and that no effort has been made to determine whether others have called attention to the same items or not. This paper may therefore contain duplications of comments previously published.

LABORATORIES OF E. R. SQUIBB & SONS.

BELGIAN PHARMACEUTICAL CONGRESS.

A congress of pharmacy was held in connection with the centenary exhibition at Liege during the second week of August. At the Conference of Pharmacy held at this time the following subjects were discussed and interesting papers presented.—General Chemistry, Pharmaceutical Chemistry, Pharmacognosy, Practical Pharmacy, Colonial Pharmacy and subjects of Chemistry and Pharmacy, relating to foods, bacteriology, biology, hygiene, etc. The Congress was under the patronage of the Duke of Brabant and was organized by the professional body of the Institute of Pharmacy of the University of Liege, the Belgian Pharmaceutical Association and the Pharmaceutical Association of the Province of Liege.

Prepare for Pharmacy Week—October 12th–19th.

ENTRIES OF PHARMACEUTICAL INTEREST FROM THE WASTEBOOK OF B. ARNOLD, DRUGGIST, BOOKSELLER, ETC., FROM LONDON.*

BY R. D. BIENFANG.

In the New Haven Colony Historical Society building at New Haven, Connecticut, there is a large black sign bearing in white letters, B. ARNOLD, DRUGGIST, BOOKSELLER, ETC., FROM LONDON SIBI TOTIQUE. This sign hung in front of Benedict Arnold's shop at the corner of George and Church Streets in New Haven, Connecticut, from about 1764 to 1778.

From the wording of the sign, one would be lead to believe that Arnold was born and educated in England, and later removed to America. Such, however, is not the case.

Benedict Arnold was born in Norwich, Connecticut, on January 3, 1741, the son of Benedict and Hannah King Arnold. At the age of fourteen, he was apprenticed in the drug store of Doctors Daniel and Joshua Lathrop in Norwich. These men, both Yale graduates, were relatives of his mother.

At one time, early in his apprenticeship, he ran away from the drug store to enlist in the British Army. His mother, however, when she heard of it, sent a friend after him. He was found, and his release secured because he was under age.

A number of stories are told of Arnold's youth to show that he was reckless and cruel as a boy. Since all of these incidents were recalled after he became a traitor, they are, perhaps, considerably exaggerated. Some, which have to do with his apprenticeship at the Lathrop drug store are these:

According to custom, all misshapen bottles and vials which came into the store were the property of the apprentices. Solomon Smith, a fellow apprentice of Arnold, was in the habit of placing his share outside where the children of the neighborhood could come and get them. It is said of Arnold that he placed his outside likewise, and when an unsuspecting child would come and take a bottle, he would chase after it with a stick, shouting, "thief, thief."

Arnold is also supposed to have strewn the broken bottles in the street so that the children coming home from school would cut their feet.

Another story is this. "A person who once remained in the shop with him during a tremendous thunder-storm, related afterward that at every particularly loud and stunning report, young Arnold would swing his hat and shout hurrah!—adding occasionally some reckless or profane expression."

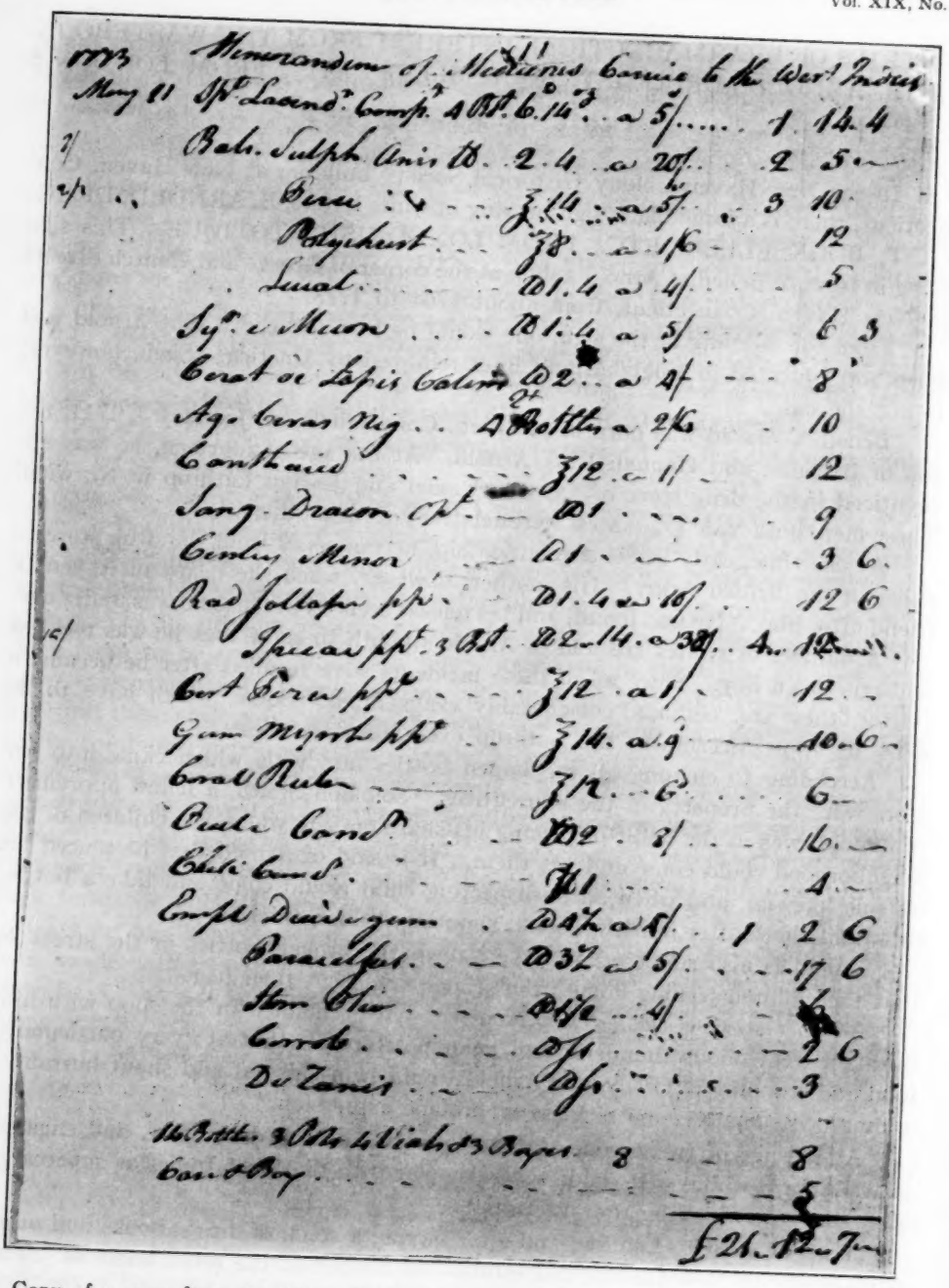
At the age of twenty-one, Arnold left the Lathrop drug store, and engaged in trade for a while. He made several voyages to the West Indies as supercargo of a vessel in which he was interested.

Then he went to London, and after buying a stock of drugs, books and other goods, came to New Haven, and established himself in the retail business. This must have been about the year 1764.

The wastebook[1] to which the writer had access, through the courtesy of the New Haven Colony Historical Society, was begun by Arnold on Monday, April 26, 1773. This book reveals the diversity of his business, there being items for

* Section on Historical Pharmacy, A. PH. A., Baltimore meeting, 1930.

[1] Ledger in which daily entries were made.



Copy of a page from the Waste Book of B. Arnold.—This in the original is page 11.

labor, use of scow, lumber, nails, rope, sugar, rum, etc., in great numbers while there were comparatively few for medicine. The latter, however, interested the writer.

All of these items were copied and are given here. Also a somewhat reduced page from the Waste Book. (Readers will find interest in deciphering the items.)

	page 24				
Sep^{t}. 14, 1774	Docter Munson D^{r}				
	to half pound Manna				
	page 37				
Feb^{y} 11, 1775	Jacob Thompson D^{r}				
	to 1 Ounce Manna at /1				
	page 47				
March 17, 1775	Dr David Atwater D^{r}				
	To pots Senna 3^{lb}	@ 4/		12	
	To Liquorish Root 11^{lb}	@1/6		16	6
	To De Balc 2$^{1}/_{2}$	2/6		6	3
	to Gentian 5	1/		5	
			1	19	9
	page 74				
Novem^{r} 8, 1775	Richard Hood D^{r}				
	To 1 oz. Spermi Citia		0:	0:	6
	page 78				
Decem. 19, 1775	Willm Lyon D^{r}				
	To 1^{lb} Borax				
	page 83				
Feb^{y} 17, 1776	Griffin Bradly D^{r}				
	To 45^{lb} Logwood	0/2		7:	6
	page 86				
June 1, 1776	M^{r} Isaac Doolittle D^{r}				
	To 4 bottles sweet oil	5/	1		
	William Lyon D^{r}				
	To 1^{lb} Borax				
	Credit by Cash		0:	14:	0
	page 90				
August 24, 1776	Doct^{r} Leveret Hubbard D^{r}				
	To 2 oz Sp^{t}. Nitre poor				
	To 1 phial				
	page 94				
Feb^{y} 3, 1777	Griffin Bradly D^{r}				
	To 20$^{1}/_{2}$^{lb} Logwood	0/3		5:	$^{1}/_{2}$
	Isaac Doolittle D^{r}				
	To 1 Bottle sweet oyl			10	
	page 95				
March 7, 1777	Doct^{r} Leveret Hubbard D^{r}				
	To 8 ^{lb} crude antimony	@ 5/	2		
	To 1 groce phial corks			3	
	To 2 Doz^{n} bottle dto		0:	1:	2
	To 1 Quire rapping paper			2	
	page 103				
Jan. 11, 1779	Cap^{t} John Elsworth D^{r}				
	To 1 bottle sweet oil			10:	0
	page 106				
April 10, 1779	Cap^{t} John Elsworth D^{r}				
	To 4 ^{lb} candles	@/10	0:	3:	4
	To $^{1}/_{2}$ ^{lb} Sal. nitre		1:	4:	0

page 107

April 21, 1779	Doct^{r} John Osborn D^{r}			
	To 3 doz^{n} Phial Corks D^{r}	0:	2:	4
	To tincture cortix lb 1 $^{1}/_{2}$ ℥	0:	6:	0
	To pot Jallap ℥ij	0:	1:	6
	To pot Ipecac ℥ij	0:	3:	0
	To Basilicum 2 oz	0:	0:	9
	To Rhubarb ℥ij	0:	3:	0
	.....			
	To sena ℥ij	0	2:	6
	Doct^{r} John Osborn Credt			
	By his bill Doctring			
	family from 6 October 1777			
	to Feb^{y} 18, 1779	1:	0:	0
	by 1 doz^{n} bottle corks	0:	0:	6
	by Radix Rhei	0:	0:	9
	by tincture cortix	0:	1:	6
	by pot Ipecac	0:	0:	0:
	by Cash	0:	10:	0
		1	13	9

In the New Haven Colony Historical Society Building there is a large black sign (shown above) bearing in white letters the inscription of the above cut. Underneath is a mortar and a medicine chest from Arnold's shop.

RELICS OF BENEDICT ARNOLD'S SHOP.

In addition to the sign mentioned at the beginning, the New Haven Colony Historical Society has a mortar and a medicine chest from Arnold's shop. (See illustration herewith.) The mortar is of gray stone, and the chest is of stained wood, with an inlaid door.

The Governor's Foot Guards of New Haven have the sink from his shop. It was hewn from a slab of stone about 3 feet by 4 feet, and 6 inches thick, and hollowed out to a depth of about 3 inches. Instead of a drain at the bottom, it has a large lip at one end.

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KARL WILHELM SCHEELE.*

The Apothecary Scientist of 18th Century Sweden.

BY LOUIS H. RODDIS.[1]

During the eighteenth century, Sweden produced three remarkable men of science, Linnæus, Swedenborg and Scheele. The story of the latter, a poor drug clerk who became one of the world's greatest chemists, forms the subject of this brief article.

The Scheele Corner in the Northern Museum at Stockholm.—The arrangement, drawers and boxes are from the pharmacy in Köping, Sweden. Here Karl Wilhelm Scheele did the greater part of his research work and he was also the owner of the pharmacy. The glass retorts and funnels and the case of coin weights were also used in this pharmacy by Scheele. A larger illustration of the drawers and wooden boxes is shown in the February number of the JOURNAL, 1930, page 103.

Birthplace of Karl Wilhelm Scheele.—Note memorial Stralsund placque on second floor.

Stralsund in Pomerania, now a province of Prussia, but then under Swedish sovereignty, was the birthplace of Karl Wilhelm Scheele, who was born on the 19th of December, 1742. He was one of eleven children, six sons and five daughters, the youngest but one of the sons. The father was a respectable merchant and

* Section on Historical Pharmacy, A. PH. A., Baltimore meeting, 1930.

[1] Lieutenant Commander, Medical Corps, U. S. Navy.

though the possessor of a moderate business was unable to provide more than an elementary education for the members of so large a family. In consequence, Karl, at the age of fourteen was entered as an apprentice to Martin Anders Bauch of Gothenberg, Sweden. In 1765 or eight years after the beginning of Karl's apprenticeship, Bauch sold his business and Scheele entered the store of the apothecary P. M. Kjelktröm of Malmö with whom he remained for three years. Both Bauch and Kjelktröm encouraged Scheele in his studies, allowed time and materials for his experiments, and these two pharmacists deserve grateful remembrance by the profession for their kindness and encouragement of the young apothecary apprentice and the opportunities they gave him for research.

While at Malmö Scheele prepared a paper on tartaric acid which was communicated to the Academy of Science at Stockholm. Through Ander Johann Retzius, the botanist, and Johann Gottlieb Gahn, the mineralogist, this paper was brought to the attention of Bergman, the greatest Swedish chemist of the day, and led to the early recognition of Scheele as a promising young scientist. In 1775 he was elected to the Stockholm Academy of Science, a very unusual honor for so young and hitherto unknown man.

Scheele's Apotheke.

In 1775 Scheele went to Köping, a small town on Lake Mälar, where he became first the manager and then the owner of a pharmacy. The period between 1768 and 1775 was passed partly in Stockholm and partly at Upsala. It was while he was at Köping that most of Scheele's work was done. Although much of his time was engaged in the management of his business, he was also carrying on researches in chemistry and pharmacy, and each year he published one or more scientific papers containing the results of his experiments.

These papers are models of what an investigator's report should be and reveal Scheele as a master of scientific method and deduction. In each scientific project he carefully planned a series of experiments that led step by step to conclusions that were apparently inevitable and as certain as some fine piece of mathematical synthesis. He never left any hazy or inconclusive points behind him and every compound was both made and unmade (analysis and synthesis) before he concluded his investigation. The whole history of chemistry contains no such record of important discoveries made by one man as this list of achievements:

Tartaric Acid, Citric Acid, Malic Acid, Oxalic Acid, Gallic Acid, Lactic Acid, Mucic Acid, Uric Acid, Benzoic Acid, Glycerin,[1] Milk Sugar, Chlorine, Oxygen and its proportion in

[1] 1930 is the Sesqui-centennial year of the discovery of glycerin.

the atmosphere, Manganese, Permanganates and their relations to the coloring of glass, Arsenic Acid, Copper Arsenite (Scheele's green), Molybdic Acid, Calcium Tungstate (Scheelite), Cyanogen and Prussian blue, Chemical action of light on silver compounds, the basis of our photography.

This is a volume of work that would be remarkable as coming from some great institution devoted to research. Yet it was the work of a poor country pharmacist who was moreover for a considerable part of the time struggling to get out of debt and place his retail business on a sound footing. In this, incidentally, he was successful and in addition to having been a leader in chemical and pharmaceutical research we might also remember that Scheele set a good example to follow in commercial pharmacy.

We are fond of designating notable epochs of human history by the name of the sovereign whose reign was contemporaneous with them. Thus we have the Georgian, the Augustean and the Victorian periods. In Sweden the Gustavian Age, roughly corresponding to the reign of the Gustav III, was one of the most brilliant in Swedish history. Yet in that splendid period when the name of Linnæus, Swedenborg and Bellman were world renowned, Scheele stands out as one of the greatest of Sweden's sons. In the history of chemistry no other man stands above him and but few beside him. Lavosier, Scheele, Davy and Liebig, are the very first names on the list of the scroll of fame in the history of chemistry. It should be a matter of particular pride to all pharmacists that a country apothecary without university education, without money or leisure, should have made himself one of the greatest, if not the greatest, research chemist of all time.

Scheele's devotion to his darling science shortened his life. His experiments led him to forget fatigue and he often overworked. Work with the poisonous cyanogen compounds also is thought to have assisted in undermining his health. He died, however, from a rheumatic attack brought on by working at night in a cold, draughty laboratory.

He had built up an excellent and successful business and had planned to marry the widow of his predecessor. This he did but on his death bed, for his marriage preceded his death by only two days. He died May 21, 1786.

Scheele's scientific papers have been collected and were translated into English in 1786 by Beddoes under the title of Chemical Essays.

There is no regular biography of Scheele, even in Swedish. The best account of him in English is in Tilden's Famous Chemists, but it is a fragmentary sketch. There is opportunity here for some graduate student in pharmacy, who possesses the necessary literary tastes and inclinations, to supply us with a "Life of Scheele." The research should include the repetition of Scheele's experiments, their interpretation in the light of modern chemistry and their expression in modern chemical symbols and equations. Sweden in the Gustavian Age, and the notable contemporary figures in science, and literature could be used to add to the coloring of the picture.

The 79th annual meeting of the AMERICAN PHARMACEUTICAL ASSOCIATION will be held in Miami, Fla., during the week of July 28th, 1931—Columbus Hotel is Headquarters. Local Secretary, G. H. Grommet.

CLAUDIUS GALEN—THE GRAND OLD MAN OF PHARMACY.

BY LOUIS WAIT RISING.

In casting about for the grand old man of pharmacy, it became increasingly evident that the final choice of just one man for that honor was well-nigh impossible. For example, to select an individual of the present day and say arbitrarily that he had done more for pharmacy than any other one man in the past twenty years would be an extremely difficult task. It would require deep diplomacy, rare tact, searching inquiry and a most delicate weighing of achievements; for there are a number of men who, to-day, are active workers in pharmacy, each functioning as the godfather of a particular branch of our profession, each doing unusually fine work in his chosen field, and whose efforts must each be considered of equal value when put together as a part of the whole.

If, however, we confine our search to the earlier periods in the history of our calling and leave the heroes of the present generation for the historians of the future, the task at once becomes easier. In the dim shadows of the past there stand out here and there, with diminishing frequency as we probe farther back toward the beginning of pharmacy as an "art," men who were the dynamic forces of their day in the advancement of this so-called "art."

Outstanding among these characters is the subject of this sketch. For the period he has no peer. That he is firmly intrenched in pharmaceutical history will be evident from the following quotation: "For convenience in teaching, we group pharmaceuticals into two classes—galenical preparations and chemical preparations." This excerpt from a widely-used text on pharmacy illustrates the lasting influence of one Claudius Galen on the Art of the Apothecary.

All of us have studied the many preparations called "galenicals" in whose manufacture no chemical reaction is involved, and know that they were named after Galen, an ancient authority on pharmacy and medicine, yet we did not fully realize just what manner of man he really was, nor how fitting it is that his memory should be so honored to-day. We were not made acquainted with one of the most remarkable characters in the history of science, who, through his ceaseless mental and physical activity, brought medicine and pharmacy out from the deeper shadows of the supernatural where they had returned at the death of Hippocrates, and who placed them once more on a rational foundation. So thorough was he in his studies, and so efficiently critical in the collection and compilation of knowledge, that his writings on medicine and pharmacy were accepted for centuries as the chief authorities.

This indefatigable seeker after scientific truths was born in the city of Pergamum, capitol of Mysia, in Asia Minor, only a hundred and thirty years after the death of our Savior. He began his education as did any other youngster of his time, but probably rapidly outstripped his classmates, for history tells us that at an early age he was familiar with the profound philosophies indulged in by the learned members of the Stoic, Peripatetic, Platonic and Epicurean school of thought. That was no small mouthful in those days for even the most intellectual of his elders.

Galen entered the medical school of Pergamum when he was sixteen. As the city had an excellent library created by the Attalid kings, he undoubtedly made

a pest of himself during the hours between classes bothering the librarians for books. The young man pursued his studies here until 148 when he left for Smyrna in order to attend the medical lectures of Pelops, a celebrated physician.

Leaving Pelops, it appears that Claudius spent the next few years travelling from country to country following the will-o'-the-wisp of knowledge throughout Cilicia, Greece, Crete, Phœnicia and Palestine. By his studies and travels, he soon gained a high reputation as a surgeon.

Whether wandering lost its glamour for him, or all the sources of information had been visited and drained of their facts, or whether he became lonesome and homesick is not known. Regardless of the reasons, Galen returned to the place of his birth in 158 and accepted the post of physician to a school of gladiators. He was probably overjoyed to take up his new duties. Dissection, except on the lower animals, was prohibited; consequently, his knowledge of the principles of surgery was vague. Here, at last, was an excellent opportunity to secure such experience and still be within the law. Gladiators were in frequent need of surgical treatment.

Just as in the twentieth century the lure of the larger opportunities in the big cities casts a spell over the more ambitious of the younger citizenry, so it was in the days of Galen. He, too, yielded to the beckoning of Fortune and moved to Rome in 164. His success as a practitioner was rapid. It was but a short time until he began mingling with the high Roman officials and numbering among his patients many of the aristocracy. His lectures and clinics were well attended by the more famous men in his profession. Here, too, he conducted what was probably the first apothecary shop to sell drugs exclusively.

This success, coupled with the fact that Galen had no patience with those who adhered to the various medical sects, made him many enemies. These he flayed with an unmercifully caustic pen and tongue, at the same time making wicked editorial jabs at the methodists, empirics and dogmatists. Galen himself belonged to no particular school, nor could he conceive of any other clear-thinking man loading his mind with dogma.

Some undetermined motive caused him to give up his excellent practice and return again to Pergamum. Some writers attribute this sudden departure to Galen's lack of courage in the face of the frequent epidemics and plagues of those days. They feel that he was afraid of contracting one of those dread diseases during its siege of Rome.

He was not destined to remain at home for long, however, as Marcus Aurelius called him back to serve in the Germanic wars. Later he evaded this duty by going to Rome as the personal physician to Commodius, the young son of the Roman general.

From this point in Galen's career, history is vague. We are relatively certain that he was still lecturing during the reign of Pertinax, that many of his works were unfortunately destroyed by fire in 191, and that he was in the employ of the Emperor Severus near the end of the second century. Practically all of the writers are agreed that he died in Sicily about 200 A.D. after living the Bibical three score years and ten.

So ended, in obscurity, the life of a truly great man, as is so often the case—the world not being particularly interested in his passing. But the world was not destined to forget so easily his monumental offerings to the deity of Progress. When

it wanted information on medicine his books were consulted; when it wanted knowledge of pharmacy his writings were studied; when it wanted direction in religion and philosophy his treatises were the guides. His masterly dissertations even covered the fields of ethics and grammar. In all, he is supposed to have been the author of around five hundred treatises and books, many of which have been translated into other languages. Eighty-three of these works which are recognized as genuine, and some others probably spurious, are still preserved in European libraries.

To delineate briefly Galen's medical and pharmaceutical achievements, he was the founder of experimental physiology and was a skilled research worker in anatomy. Most unusual for that time is the fact that he recorded and described only what he actually saw. His contemporaries were prone to imagine a great many things and to describe these figments of fancy in detail as though they actually existed, but not so with Galen. It is true, nevertheless, that he, in common with the other anatomists of the time, held some peculiar hypotheses regarding the functions of the various parts of the body, but there the resemblance stops.

Galen's investigations were made mostly on the lower animals. According to one authority, he recognized the lacteal vessels and described the ducts of the lingual and sub-maxillary glands, being unaware, however, of their function. He knew of insensible perspiration, and had ligatured the recurrent laryngeal nerve and noted the results. His description of the heart with its three layers of fibre, which he hesitated to call muscle because of its unusual characteristics, was accurate, as was the account of the valves of that organ. One of the outstanding results of Galen's research was definite proof that the arteries carried blood and not air, thus exploding the theory that the Alexandrians had been expounding for centuries.

In pharmacy, Galen left us his very long list of vegetable preparations, or simples, and thereby unwittingly engraved his name permanently in our roster of manufacturing pharmacists. It must not be believed, however, that because Galen introduced a vegetarian type of medicine he knew of no other therapeutic agents. Quite the contrary. He was adept in the use of earths or clays and the fumes of minerals, especially, according to LaWall, of orpiment. This author claims, too, for Galen the honor of originating our present-day "cold cream," or rose water ointment. He also believed in amulets and spiritual cures. Cullen states that the famous anodyne necklace is the result of this faith in the occult. It seems peculiar to some that a man possessed of as much hard common sense as was Galen should believe implicitly in the healing power of charms. Nevertheless, this error in therapeutics was minor when compared with the progressive results of Galen's activities.

Galen has been criticized in very derogatory terms by a few of his successors and by compilers of historical data who feel that because of the intrusion of spiritualism in his materia medica and because many of his orthodox prescriptions were worthless and built up utterly without rhyme or reason, he must have been considerable of a fakir. They forget that Galen was living in an age when everybody accepted the supernatural as the most plausible explanation of things they did not understand. Disease, illness and misfortunes of all kinds came and went, according to the people of that time, in a mysterious, preternatural way; therefore, only mystical charms and black magic could combat them. What is more natural for a

simple people? Our illiterate and uninformed of to-day respond in a large degree to such psychology. It would be extremely hard for even the most advanced genius of that age to throw off completely the yoke of superstition. Galen displayed more than ordinary mental resolution to diagnose and to attempt cures in a reasonable fashion. The critics disregard, too, the fact that therapeutics was not a science in 130 A.D. Consequently, Galen working in the dark, pioneering the field and being only human, reacted to many of the fabulous ideas then prevalent regarding the medical virtues of certain things. Notwithstanding, his works were sufficiently in advance of his time to be considered as authorities in schools of medicine and pharmacy until the fifteenth and sixteenth centuries.

It is not possible in a paper of this kind to present an extended dissertation on the qualities and accomplishments that made Galen the figure in history that he is. But one more thought in closing; how many scientists of to-day, had they been working in Galen's time with practically nothing in the way of absolute knowledge or facilities for research, and being opposed at every turn by narrow, prejudiced and antagonistic schools of thought, would have accomplished even a small fraction of the things Galen did, and would have made for themselves reputations which would survive centuries upon centuries? What more fitting, then, than that he be called "The Grand Old Man of Pharmacy?"

GALEN.

The bust of Galen (?) shown herewith comes indirectly through "Pettigrew's Medical Practice" and is traditionally credited with being that of Galen. The history in brief is, that the bust was presented to the Royal College of Physicians (Great Britain), by Alexander Adair, principal surgeon to the British forces at the siege of Quebec. Biographical references to Robert Adair state that he was a man of considerable eminence in his profession, a man of character and a scholar. This is as near to an authentic statement that we can make.

Wooton, in his "Chronicles of Pharmacy," states that Galen is sometimes said to have kept a pharmacy in the Via d'Acra at Rome, his apotheca. There appears to have been a house where his writings were kept and where other physicians came to consult them. This house was afterwards burned, and it is supposed that a number of the physicians' manuscripts were destroyed in that fire.—E. G. E.

ASSOCIATION BUSINESS

THE COUNCIL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION, 1930–1931.

Office of the Secretary, 10 West Chase St., Baltimore, Md.

LETTER NO. 3.

September 6, 1930.

To the Members of the Council:

30. Minutes First Meeting. Motion No. 1 (see Council Letter No. 2, page 918) has been carried and the minutes are approved.

31. Western New York Branch, A. Ph. A. Motion No. 2 (see Council Letter No. 2, page 920) has been carried and the application and By-Laws of the Branch are approved.

32. Election of Members. Motions Nos. 3, 4 and 5 (see Council Letter No. 2, pages 920–921) has been carried and applicants numbered 1 to 56, inclusive, and H-1 to H-15, inclusive, and L. M. 1, are declared elected.

33. Use of Text of N. F. V. Motion No. 6 (see Council Letter No. 2, page 921) has been carried and Drs. DuMez and Jenkins have been so notified.

34. Committee on N. F. Publicity. Motion No. 7 (see Council Letter No. 2, page 922) has been carried and President Christensen has been so advised.

35. Publication of Supplements to N. F. No comments have been received (see Council Letter No. 2, page 922).

36. Local Secretary for 1930–1931. No nomination other than that of Mr. G. H. Grommet has been received (see Council Letter No. 2, page 924).

(*Motion No. 9*) *It is moved by Beal that G. H. Grommet be elected Local Secretary for 1930–1931.*

37. Time of the 1931 Meeting. Motion No. 8 (see Council Letter No. 2, page 924) has been carried and the week of July 28th has been approved as the time for the meeting.

38. Headquarters for 1931 Meeting. The Local Committee in Miami through Mr. Grommet has recommended that the Columbus Hotel be approved as the official headquarters. President Christensen recently visited Miami and consulted with the Local Committee in reference to arrangements for the meeting. He inspected the Columbus Hotel and found that the rooms available for the business meetings are sufficient in number and in seating capacity. Other large hotels are near the Columbus Hotel and the accommodations are ample.

(*Motion No. 10*) *It is moved by Christensen that the Hotel Columbus, Miami, Florida, be the official headquarters for the 1931 meeting.*

39. Annual Joint Meeting Executive Committees of the N. A. R. D. and the A. Ph. A. Following the usual custom, members of the Executive Committee of the N. A. R. D., through Secretary Henry, have invited the members of the Council to meet with them at the Ambassador Hotel, Atlantic City, N. J., on Monday, September 15, 1930, at 11 A.M., daylight saving time, during the annual convention of the N. A. R. D. The members of the Council who will be in Atlantic City are requested to attend this joint meeting.

40. Use of the Text of the N. F. V. The following communication has been received from Chairman DuMez of the Committee on Publications:

> "This will acknowledge receipt of the request of Prof. H. J. Fuller of the Connecticut College of Pharmacy to use portions of the text of the National Formulary in the preparation of a book entitled 'A synopsis of the United States Pharmacopœia and National Formulary Preparations,' together with the sample of manuscript that you enclosed.
>
> "In view of the fact that the proposed book does not give working formulas, and conforms in other respects to publications which have already been given this permission, I recommend that the requested permit be issued to Prof. Fuller and that the usual fee of $5.00 be charged."

(*Motion No. 11*) *It is moved by DuMez that H. J. Fuller be given permission to use the text of the N. F. for partial reproduction in "A Synopsis of the United States Pharmacopœia and National Formulary Preparations" and at the usual charge of $5.00.*

41. Price of Collective Index, 1903–1925. The following communication has been received from Chairman DuMez of the Committee on Publication:

> "The matter of raising the price of the

Collective Index recently published in order to make it cover the cost of preparation, has been taken up with the members of the Publication Committee. All of the members are agreed that the price should be raised to cover the cost completely. I therefore recommend to the Council that a charge of $6.50 per copy be made in the future."

It was originally estimated that the cost of the Index would be covered by a selling price of $5.00 and about 350 advance orders have been filled at that price. The completed Index is much larger than was anticipated and the cost is correspondingly larger.

One thousand copies were printed of which seven hundred and fifty were bound.

(*Motion No. 12*) *It is moved by DuMez that the price of the Collective Index of Proceedings and Year Books, 1903–1925, be increased from $5.00 to $6.50.*

42. Applicants for Membership. The following applications properly endorsed and accompanied by the first year's dues have been received:

No. 57, K. B. Bowerman, 356 Post St., San Francisco, Calif.; No. 58, Forrest V. Curtis, Haven, Kans.; No. 59, H. J. Fuller, 150 York St., New Haven, Conn.; No. 60, G. H. Grommet, 2364 S. W. 11th St., Miami, Fla.; No. 61, Reuben Leonard McMaster, 6th & Congress St., Tucson, Ariz.; No. 62, A. A. Maier, 150 York St., New Haven, Conn.; No. 63, Rubin Robert Miller, 1696 Carroll St., Brooklyn, N. Y.; No. 64, Mitchell L. Misita, 6th & Congress St., Tucson, Ariz.; No. 65, Louis William Schleuse, c/o Univ. of Texas College of Pharmacy, Austin, Texas.

(*Motion No. 13*) *Vote on applications for active membership on the American Pharmaceutical Association.*

E. F. KELLY, *Secretary.*

PHYSICIANS AND PHARMACISTS AND JAPANESE HEALTH INSURANCE.

In examining the condition of furnishing medicine and medical treatment in connection with Health Insurance, it was found that, whereas the Japanese Medical Association has been receiving something like 700,000 or 800,000 yen per month, the revenue of the Japanese Pharmacist Union from the same source for September 1927, was only 1,058.80 yen. This latter amount still took a downward course; it became less than one thousand, and was reduced steadily until it amounted to only about 180 yen for June of this year—this revenue is for nearly 10,000 pharmacists scattered throughout the whole country; it means contempt and irony for them. The reason for this state of affairs is said to be due to the refusal of physicians to issue prescriptions. Protest was first made by the pharmacists of Osaka and it resulted in the establishment of an association for the study of the health insurance attached to the Japan Pharmacists' Union. The association held its first meeting on July 23rd and 24th at the Imperial Academy Hall, Kanda, Tokyo. The members of the association later called on the Social Bureau which is in charge of the Health Insurance. They also visited the Chief of the Health Bureau. A series of questions was presented to the Chief of the Social Bureau concerning the insurance. It is probable that, should the answer of the Social Bureau prove satisfactory, the pharmacists may withdraw from the Health Insurance Administration; this was made known to the Government authorities. The following questions were presented to the officials:

1. Is not the separation of medicine and pharmacy desirable for the administration of Health Insurance?
2. Has the Government made any comparative study of the respective merits of such a system with the existing system under which no separation is recognized?
3. Has the Government made any study of the effects on the pharmacists after the Health Insurance law has been put into effect?
4. Has the Government ever studied the refusal by physicians of the requests of insured workers for prescriptions?
5. Does not the Government contemplate to encourage the insured persons to ask for prescriptions?
6. Does not the Government regard the refusal of the physician to issue prescriptions as a systematic denial of separation between pharmacy and medicine?
7. Does not the Government plan to call a conference of physicians, pharmacists, Government representatives and representatives of insured persons?

COMMITTEE REPORTS

PHARMACY CORPS IN EUROPEAN ARMIES.

(*Continued from p. 655, June* JOURNAL, A. PH. A.)

The Reporter is again under obligations to Secretary-General J. J. Hofman of the International Federation for the information from which the following reports have been prepared. A brief report of the Federation meeting in Stockholm was published in the August JOURNAL, pages 915–916. The JOURNAL contributed to the report as far as the United States is concerned, to "The Report of the Committee on Medicines in Ships."

The first of the reports relates to Military Pharmacy in France. There have been some changes since a report was made in 1917 by the late George M. Beringer—see pages 967–975, JOURNAL A. PH. A. for November 1917. It is hoped to have reports from other countries before the next meeting of the ASSOCIATION but it is deemed advantageous to print the following at this time, as the returns from some countries require considerable correspondence and translations.

FRANCE.

1. What is the number of Military Pharmacists in active service in peace time?

The Corps of French Military Pharmacists of the active lists is the twelfth of the effective military physics (doctors) which has the same appellation and the same meaning.

Frequently the military doctors of each active list, being also much more numerous, the effective medical transport in addition 6 officers general divisionnaries (that is to say, beyond the grade of General of Division).

In the active list, in peace time the military pharmacists of the metropolitan army are in number 131, divided thus:

1 Pharmacist General (grade of General of Brigade)
6 Pharmacist Colonels
9 Pharmacist Lieutenant-Colonels
29 Pharmacist Commandants
52 Pharmacist Captains
34 Pharmacist Lieutenants and Sub-Lieutenants

131 Total

The pharmacists' assignment to the service in France, with North Africa (Algiers, Tunis, Morocco), is in the exterior theater of operations.

In the French colonies, the service is assured by a corps of Pharmacists from the colonial troops, in number 74, represented thus:

1 Pharmacist General
4 Pharmacist Colonels
5 Pharmacist Lieutenant-Colonels
16 Pharmacist Commandants
30 Pharmacist Captains
18 Pharmacist Lieutenants and Sub-Lieutenants

74 Total

There exists in addition a corps of pharmacists of the *Navy*, having at its head a pharmacist general officer with the rank of *Admiral*. The number of pharmacists of the Navy on active list, is, in peace time, 52.

As general total, in France, which in peace time numbers 257 pharmacists of the armies of land and sea are divided thus:

Metropolitan Army	131
Colonial Army	74
Navy	52
Total	257

2. What is the number of Pharmacists in the Reserve?

The number of pharmacists of the Reserve of the Metropolitan Army is about 3500.

I am ignorant of the number of pharmacists of the Reserve of the Colonial Army and the number of pharmacists of the Reserve of the Navy.

3. What grades do pharmacists occupy with the Army?

In the army the pharmacists occupy the following grades:

(In the Metropolitan Army) and (in the Colonial Army):

7 grades
Pharmacist General
Pharmacist Colonel
Pharmacist Lieutenant-Colonel
Pharmacist Commandant
Pharmacist Captain
Pharmacist Lieutenant
Pharmacist Sub-Lieutenant.

4. With what grade do their duties commence?

With the grade of Sub-Lieutenant.

5. To what grade may they be promoted?

With the active list Military Pharmacists may go to grade of Pharmacist General (grade corresponding to the grade of Brigade General of the fighting forces).

In the Reserve List, one may go to grade of Pharmacist Colonel.

6. And the Assistant-Pharmacists, Aides with diplomas, Aides without diplomas, how many in the military pharmacies?

Of the Auxiliary Pharmacists there is a sub-officer with the corresponding grade to that of adjutant of the fighting troops.

In peace time, the grade is given to graduate pharmacists; that is their period of active military service and that which is later in the Reserve, the pharmacists of Reserve (officers).

There exists equally, in the military pharmacies Aides without diplomas. They are in the infirmáries, who are students in the pharmacy profession and who are in active military service.

Or giving preference in the military pharmacies to the cause of their profession.

7. What are the duties of Military Pharmacists?

The Military Pharmacists of the active list are recruited, by the Metropolitan Army for the service school of Health of Lyon, which contains a medical branch and a pharmaceutical branch. At the end of their studies they are promoted from the school at Lyon coming for a year at the school of application of health service, to Val de Grace, at Paris.

After the War, during their year at Val de Grace, those promoted were prepared to receive the certificates which lead to the license and sciences, from the Faculty of Sciences.

A requirement at this time is that the Military Pharmacists of each active list possess in addition to their pharmacist diploma, that of license of science, which is Doctor of Sciences here to Doctor in Pharmacy; they are equal.

The privileges and duties of the Military Pharmacists of the active list are the following:

The Pharmacist General who is of right member of consultative military committee of health is in charge of maneuvers and inspection of the pharmaceutical establishments of service of Sauld (pharmacies of military hospitals, pharmaceutical supplies, medicine reserves).

It is that which precedes meeting of the Examination Board for the entrance of those promoted from the study of application to the Val de Grace.

A Pharmacist Colonel is Director of the Central Pharmacy of the Army at Paris. It is this pharmacy which supplies the pharmacies of the military hospitals.

The other Pharmacist Colonels and Lieutenant Colonels are under the direction of the pharmacies of supplies of Lyon, Marseille, Bordeaux, etc. They are pharmacists from the large hospital in the Military region in Paris.

Two Pharmacist Commandants are professors to the Service School of Sauld of Lyon and the School of Application of Val de Grace. Two others direct the laboratories of the central pharmacy of the Army in Paris.

The other Pharmacist Commandants and the Pharmacist Captains are pharmacists of military hospitals.

The Pharmacist Lieutenants, who are in sub-class are either at the central pharmacy of the Army, or in the pharmacies of supplies in the military hospitals.

The Pharmacist Sub-Lieutenants, who are at Val de Grace, to the school of application.

The indications (reports) from these posts show that the pharmacists in addition to their own duties are veritable technical counsellors and the directors of laboratories for the research and the analysis, concerning the food for Denrees, etc. (Denrees Colonials?).

In addition, there is under their direction, which is executed, all the measures of hygiene, and of disinfection which are ordered.

8. In case of mobilization, what manner of hospital service is assured?

In case of mobilization, the hospital service is assured likewise by the pharmacists of the active as well as of the reserve.

The pharmacist of grade who is also student is chief of service in the hospitals which in importance contain many pharmacists.

It is the pharmacists who distribute, divide the duties of everyone under orders.

SPAIN.

1. What is the number of Military Pharmacists in active service in peace time?

The number of Military Pharmacists in active service in time of peace, in Spain is 150.

2. What is the number of Pharmacists in the Reserve?

The number of Pharmacists in Reserve is 94.

3. What grades do pharmacists occupy with the Army?

The grades that the pharmacists occupy in the Army are:

Second Pharmacist (Lieutenant)
First Pharmacist (Captain)
Major Pharmacist (Commandant)
Second Sub-Inspector (Lieutenant-Colonel)
First Sub-Inspector (Colonel)
Inspector (General of Brigade).

4. With what grade do their duties commence?

The Military Pharmacists begin their duties with the grade of Lieutenant.

5. To what grade may they be promoted?

The Military Pharmacists are promoted as far as grade of general of brigade (are advanced).

6. How many Assistant-Pharmacists, Aides with diplomas and without diplomas in the military pharmacies?

In the military pharmacies there are no Pharmacists and Aides without diplomas, but by opposition with variable number according to the needs of the pharmacy.

7. What are the duties of Military Pharmacists?

The duties of the Military Pharmacists are:

a. In the pharmacies of the hospital.

b. In the pharmacies established by the military service and of other army corps.

c. In the laboratories.

YUGOSLAVIA.

The following information has come through the Royal Minister of War at Belgrade:

1. Number of Military Pharmacists 130.

2. First grade of active service is that of Lieutenant; in Reserve that of Sub-Lieutenant.

3. The superior grade is that of Colonel.

4. Assistant Chemists—The plan is always in order to name subordinate pharmacists with certified diplomas.

5. The duties of Military Pharmacists consist of purchasing, guarding and preparation

of sanitary material, control of administration, guarding and production of sanitary material; preparation of medicine; prescriptions from technical conditions and improvement of sanitary material, control of first ailments.

(We have not been able to obtain the other information requested.)

NEWS BULLETINS OF THE DRUG TRADE BUREAU OF PUBLIC INFORMATION.

Director Robert P. Fischelis has issued further bulletins, being Nos. 20–27; prior bulletins were mentioned in July JOURNAL.

It is of interest to report that **Dr. Robert P. Fischelis** has been appointed to the research staff of the Committee on the Cost of Medical Care. The Committee was organized to study the economic aspects of the prevention and care of sickness, etc. The Committee has mapped out a 5-year program of fact-finding and is now in the third year of its work. Dr. Fischelis has acted as consultant to the Committee on pharmaceutical matters and is now engaged with Dr. C. Rufus Rorem, another member of the research staff, in a joint study of the "Service of Pharmacy" as it pertains to medical care.

Bulletin No. 20 relates to the activities of the American Association of Colleges of Pharmacy, reporting on the number of students in colleges of pharmacy, and other work transacted at the Baltimore meeting.

Bulletin No. 21 gives publicity to the meeting of the National Association of Retail Druggists, now in session in Atlantic City.

Bulletin No. 22 relates to the coming Pharmacy Week, October 12th–18th; further reference will be made under *Bulletin No. 27*.

Bulletin No. 23 reports on the progress being made by the Committee of Revision of the National Formulary. Data are being collected and compiled on the extent of use of the preparations of the N. F. in order to extend its service.

Bulletin No. 24 reports on the fatal error in prescription compounding reported in the August JOURNAL.

Bulletin No. 25 reports on the work of Dr. H. V. Arny and his co-workers on the effect of light on pharmaceutical and chemical preparations. As examples of questions involved are the following: What causes change of a golden-yellow ointment to a nondescript gray? What causes change in color of medicines? What color of glass will best protect the preparation from change? This has opened a most interesting subject and very important. More than 2000 specimens will be subjected to tests, sealed in pyrex tubes, exposed to unimpeded daylight; some for one month, other varying periods up to one year. Other tests will also be applied—the difference of daylight of the winter months against those of the summer, etc.; also non-exposure to light, in efforts to arrive at conclusions which will be serviceable in properly taking care of medicines. It is reasonable to assume that the pharmacy student of to-morrow will have the results as important subjects of his study.

Bulletin No. 26 relates to the meeting of the National Wholesale Druggists' Association in Chicago, October 12th–19th, which promises to be a most interesting and important convention—the keynote to be "better business."

Bulletin No. 27, because of Pharmacy Week, is reprinted; parts of *Bulletin No. 27*, are included.

Plans for the sixth annual observance of Pharmacy Week, which will be celebrated by pharmacists in the United States, Canada, England, South Africa, Australia, New Zealand and Tasmania and probably several of the Latin American countries, have been announced by Dr. Robert J. Ruth of New York, National Chairman of the Pharmacy Week Executive Committee, through the Drug Trade Bureau of Public Information. The various national pharmaceutical associations are coöperating again to bring to the attention of the public from October 12th–18th the importance of the pharmacist as a public health servant.

Publishers of pharmaceutical journals are preparing special editions of their October issues, which will be devoted to historical as well as up-to-date scientific articles dealing with the advances in the profession and business of handling drugs and medicines.

Plans for a gigantic radio broadcast are included in the program projected by the Committee, and it is expected that the various broadcasting companies, as well as radio advertisers

dealing in articles sold through pharmacies, will devote considerable time during Pharmacy Week to focusing public attention upon the pharmacist and his service to the community.

The Pharmacy Week Executive Committee includes the following:

AMERICAN PHARMACEUTICAL ASSOCIATION.—Robert J. Ruth, *Chairman*, N. Y. City; Frederick B. Kilmer, New Brunswick, N. J.; William B. Day, Chicago, Ill.; W. Bruce Philip, San Francisco, Calif; Hal E. Duncan, Birmingham, Ala.

NATIONAL ASSOCIATION OF RETAIL DRUGGISTS.—Jos. W. Noble, *Chairman*, Philadelphia, Pa.; A. V. Burdine, Washington, D. C.; H. Peterson, Minneapolis, Minn.; L. P. Larsen, Chicago, Ill.; F. A. Mortensen, Los Angeles, Calif.

Coöperating Groups:

Committee on Education and Research of the National Wholesale Druggists' Association:—H. J. Bowerfind, Ft. Wayne, Ind., *Chairman;* E. L. Newcomb, New York City, *Secretary.* Federal Wholesale Druggists' Association.—J. H. Marshall, Minneapolis, Minn., *President;* R. E. Lee Williamson, Baltimore, Md., *Secretary.* Drug Trade Bureau of Public Information.—Ambrose Hunsberger, Philadelphia, Pa., *President;* R. P. Fischelis, Newark, N. J., *Director;* H. C. Christensen, Chicago, Ill., *Secretary.*

The Deans of the Colleges of Pharmacy.

The Editors of all Journals of Pharmacy.

Members of the State Boards of Pharmacy.

The Secretaries of State Pharmaceutical Associations.

A Chemical Map of North America, indicating the sources of all ores, minerals and elements from which fine medicinal chemicals are made, has been prepared by Dr. E. L. Newcomb, Secretary of the National Wholesale Druggists' Association, in collaboration with Dr. H. V. Arny, Dean of the College of Pharmacy, Columbia University, according to an announcement by Henry J. Bowerfind, Chairman of the Committee on Education and Research of the National Wholesale Druggists' Association, through the Drug Trade Bureau of Public Information. This map is to be used as a part of the educational program which has been launched by national pharmaceutical associations in connection with the celebration of Pharmacy Week, October 12th–18th.

This map is the first attempt of its kind to demonstrate to the public the wide range of sources of the chemicals which must be kept on the shelves of the fifty-five thousand or more drug stores in the United States so as to be ready when they are called for on physicians' prescriptions.

Around the border of the map are a series of sketches illustrating mining or production operations of the more important ores, minerals and chemicals. These are reproduced in colors. Under the title of the map there is a paragraph of explanation, which includes information on the value of the map, to bring to the attention of the public the great breadth of knowledge required by the pharmacist in the practice of his profession. The names of practically all cities where drug and chemical manufacturers and wholesale druggists are located are also shown. Throughout the entire continent there appears on the map the names of all ores, minerals, chemicals or other elements, chiefly inorganic. These names are placed approximately at the point of origin of each substance. The map also shows the names of some twenty-five more commonly used household chemical medicinal agents. These are placed at the point of chief production, and are indicated in larger type and made to stand out by being placed in red boxes.

The back of the map is very largely taken up by a comprehensive index. This index enumerates in geographic arrangement the drug and chemical manufacturers and wholesalers of the United States. The names of all manufacturers are symbolized and this indicates the exact nature of their manufactured products. In alphabetic arrangement there also appears a complete list of United States Pharmacopœia and National Formulary chemicals.

The map is lithographed in five colors on a sheet 44 x 64 inches in size, and represents all countries from the Panama Canal Zone to Hudson Bay. The countries, States and Provinces are all properly labeled and reproduced in yellow; oceans and lakes in blue; political boundary lines and locations of more important cities in red; mountains in sepia, rivers and most type matter in black.

Copies of the Chemical Map of North America may be obtained for use in schools, libraries and other educational institutions by applying to the National Wholesale Druggists' Association, 51 Maiden Lane, New York City.

PHARMACY WEEK SUCCESS ASSURED.

BY ROBERT J. RUTH, NATIONAL CHAIRMAN PHARMACY WEEK EXECUTIVE COMMITTEE.

The approaching Pharmacy Week, October 12th–18th, was so well publicized in the August issues of the journals of pharmacy that more pharmacists are planning to observe the sixth annual observance this year than in any previous year. The mail at Pharmacy Week Headquarters, 745 Fifth Avenue, New York City, shows an unprecedented interest in this annual event which is steadily creating a deeper public appreciation of Pharmacy and Pharmaceutical Service.

Local and State Pharmaceutical Associations are active in the campaign as never before. Many local associations of retail druggists have requested the set of newspaper mats furnished by E. R. Squibb & Sons and the mats of the editorial supplied by *American Druggist* and plan to use them coöperatively in local newspapers during Pharmacy Week. In addition to the 28 Hearst newspapers throughout the United States, which will publish the *American Druggist* editorial full page, it will also be published in many newspapers in England during Pharmacy Week. This is only a part of its Pharmacy Week program which was previously announced. Arrangements have also been made for an article by Dr. Bernard Fantus of the American Medical Association, which will be published in many newspapers throughout the United States. Dr. Fantus makes an appeal, in his article, for a closer relation between the professions of Medicine and Pharmacy.

An outstanding event in connection with the observance of National Pharmacy Week last year was the contribution by twelve of the largest manufacturers in the drug and allied fields of all or part of their radio time to a public tribute to the pharmacists of the United States and Canada.

The coöperation of these manufacturers was secured by *Drug Topics*.

It was estimated that the broadcasts by these manufacturers were heard by more than 50,000,000 people throughout North America. The broadcasts were carried not only over the coast-to-coast networks of each of the national broadcasting systems, but over innumerable local stations as well. A total of 84 radio stations participated in the broadcast of Pharmacy Week.

This year, *Drug Topics* again is making arrangements with manufacturers in the drug and allied trades for the contribution of radio time during Pharmacy Week. At the present time, because the radio programs of many of the manufacturers are not completed, and will not be completed until some time in September, the exact number of manufacturers who will participate in Pharmacy Week broadcasts cannot be known. It is expected that at least as many manufacturers as contributed radio time last year, and probably several others, will again do so this year. This means that the 1930 radio broadcast during Pharmacy Week will be a monumental contribution toward the event.

Last year arrangements were made with Barron Collier, Inc., for the distribution in 5000 street cars, elevated and subway trains of 5000 car cards containing a tribute to pharmacy prepared by the editors of *Drug Topics*. These car cards, it was estimated by the Barron Collier organization, were seen by 25,000,000 or more people during the time that they remained on display in the cars. The subways of New York alone carry 2,000,000 passengers daily; riders on the elevated and street cars running into additional millions.

According to present plans, a car card campaign on behalf of Pharmacy Week on the proportions of last year's campaign, possibly larger, will be duplicated this year.

In addition to all this, *Drug Topics* will again publish a special Pharmacy Week issue. This will be read by 57,000 retail druggists, readers of that publication. Contributors to this special Pharmacy Week issue will include some of the most notable leaders of professional pharmacy both in this country and abroad.

The October issue of *Druggists' Circular* will be a special Pharmacy Week Edition. It will be in the mails on October 1st, and in addition to featuring Pharmacy Week, will carry the full story of the N. A. R. D. Convention to be held at Atlantic City, September 15th–19th.

Dr. E. L. Newcomb, Secretary of the National Wholesale Druggists' Association, announces that the Drug and Chemical Map of North America and the Pharmacy Week window streamers, prepared under the auspices of the Committee on Education and Research of the N. W. D. A., are now in the hands of the lithographers and will be available without charge to retail druggists from their wholesale druggists the latter part of September. The work on these maps was done by Dr. E. L. Newcomb and Dr. H. V. Arny, Dean of the College of Pharmacy at Columbia Uni-

versity and it constituted a colossal task, the result of which is a valuable contribution to Pharmacy.

The *Missouri Druggist*, through its editor, W. H. Lamont, has promised a double spread in the September and October issues, featuring the Cloughly Cup, which is the annual prize donated each year by Mr. O. J. Cloughly, for the best Pharmacy Week window in the State of Missouri. L. S. Williams, President of the Maryland State Pharmaceutical Association and E. D. Oslin, Secretary of the Arkansas State Pharmaceutical Association, are offering prizes for the best Pharmacy Week windows in their respective states. Pharmacy Week window contests will again be conducted by the San Francisco Retail Druggists Association and the Alameda County Pharmaceutical Association of which W. Bruce Philip is secretary. It is expected that many other window display contests will be conducted by local and state associations.

Merck & Co. will supply retail druggists with a handsome placard, in two colors, on the subject of "Why Uncle Sam O. K.'d the Pharmacopœia." These placards may be obtained on request from wholesale drug houses throughout the country and will greatly enhance the effectiveness of Pharmacy Week windows.

Owens-Illinois Glass Co., Toledo, Ohio, have reproduced their beautiful painting, "The Druggist" on the backs of playing card Bridge Decks. They expect to distribute 50,000 of these decks during the six weeks, September 20th–October 31th, in connection with their regular sales activities.

The editor of *Northwestern Druggist* says in the August issue of that publication: "The Northwest Pharmaceutical Bureau is planning to release several publicity articles to Northwest newspapers. Through the 'Merchandising Guide,' in a joint effort, there will be presented special Pharmacy Week window display plans and numerous suggestions for creating a better understanding of Pharmacy through Northwest drug stores. Don't wait till October 12th to plan your Pharmacy Week Campaign—start now!"

REPORT OF THE FAIRCHILD SCHOLARSHIP EXAMINATION.

The Fairchild Scholarship Examination was held as usual on the second Monday in June. The questions were prepared by the members of the faculty of Purdue University, Lafayette, Ind., under the chairmanship of Dean C. B. Jordan.

Thirty-seven students from twenty-three schools took the examination. The papers were graded by Dean W. F. Gidley of the University of Texas. Neither of the schools aiding in the preparation and grading of the papers candidates had for the examination. The usual great care was exercised in handling the papers.

The results of the examination are as follows and the selection of the winner was unanimous.

	Chemistry.	Pharmacy.	Bacteriology-Physiology.	Arithmetic.	Botany.	Average.
1.	98	94 1/4	90	93 1/2	94 1/2	94.00
2.	94 5/6	92 1/2	90 1/6	98	93	93.69
3.	97	87	90 1/2	100	91 3/4	93.25
4.	95 1/3	88 3/4	88 1/4	100	89	92.27
5.	97 2/3	87 3/4	87 1/2	90	94	91.38
6.	90 1/2	91 1/4	79	100	91	90.35
7.	85	91	88	92	94	90.00
8.	82 1/3	92 1/2	81	96	92 1/2	88.87
9.	76 1/6	89	90 1/2	98	89 1/2	88.68
10.	78 2/3	84	90 3/6	80	94	85.48
11.	83	87 1/2	85 1/2	80	87 3/4	84.75
12.	71 2/3	77 1/2	87 1/2	100	87	84.73
13.	65 1/2	89	89 3/6	90	87 1/2	84.27
14.	68 5/6	90	88 1/2	77	92	83.27
15.	75 2/3	88 1/2	81 1/4	80	90 1/2	83.18
16.	71 5/6	76 4/5	86	88	91	82.72
17.	83 2/3	83 1/2	78 1/2	70	93 3/4	81.88

	Chemistry.	Pharmacy.	Bacteriology-Physiology.	Arithmetic.	Botany.	Average.
18.	82 1/2	78	74 3/4	84	79 1/2	79.75
19.	73	71 1/2	77	89	88	79.70
20.	73 8/9	81 3/4	79 5/8	70	89 1/2	78.95
21.	61 1/2	89 1/2	79	67	94 1/4	78.25
22.	54 1/6	80 4/5	69 1/4	100	80 1/2	76.94
23.	72 1/3	75 1/2	77 5/8	67	89 1/2	76.39
24.	78	69	70 1/2	64	92	74.70
25.	71 5/9	80 3/4	65	80	74 1/2	74.36
26.	60 5/6	91 3/4	67 3/4	61	89 1/2	74.17
27.	68	73 3/4	78 1/2	65	84	73.85
28.	55 2/3	76 1/2	77	82	78	73.83
29.	63 1/3	65 3/4	78 1/2	65	92 3/4	73.07
30.	73 1/2	75 1/4	66	67	83 1/2	73.05
31.	72 1/2	70 1/2	64 1/2	85	72	72.90
32.	78 1/6	74	74 1/4	64	70	72.08
33.	67 11/18	78	64 1/2	61	86 1/4	71.47
34.	49 7/12	75 1/2	71 3/4	70	88 1/4	71.02
35.	57 1/6	77 1/4	62 1/2	84	74	70.98
36.	26 7/9	71	63	82	75 1/4	63.61
37.	27	63	51 1/2	25	65	46.30

The highest percentage made in Chemistry was 98; the lowest, 26 7/9. Fourteen of the students averaged more than 75%; the general average was above 72.

The highest record made in Pharmacy was 94 1/4; the lowest, 63. Twenty-seven averaged above 75; the general average was above 81.

The highest percentage made in Bacteriology-Physiology was 90 1/2. Twenty-three candidates averaged above 75; the general average was above 78.

One hundred per cent was made by five candidates in Arithmetic; the lowest percentage made was 25. Twenty-four candidates averaged above 75; the general average was above 75.

The highest percentage made in Botany was 94 1/4; the lowest made 65, and the general average was above 87.

The general averages on all subjects were above 79 and twenty-three averaged above 75.

The one of highest average ranked first in Chemistry, Pharmacy and Botany. The one with the second highest general average was first in no subject of the examination. The one making the third highest general average was highest in two subjects, namely, Bacteriology-Physiology and Arithmetic; in the latter subject he made 100. However, he shared honors with four others. Those making 100 in Arithmetic ranked in general average 3rd, 4th, 6th, 12th and 22nd. Other comparisons can readily be made. The Chairman hopes that a method may be developed for the next examination wherein more than answers to questions will decide who is entitled to the award.

The Committee is grateful and thanks Dean Jordan and Dean Gidley and all who contributed help in this work; it meant hours of time during their vacation period. Their work was done with greatest care, as was to be expected.

THE WINNER OF THE FAIRCHILD SCHOLARSHIP IN 1930.

The winner of the Fairchild Scholarship for this year was Solomon Gershon, 505 N. Glenwood Ave., Chicago, Ill. Mr. Gershon graduated from McKinley High School. He matriculated at the School of Pharmacy, University of Illinois, in 1927, where he made excellent records, graduating in 1930 with honors in Chemistry. The reporter understands that the Fairchild Scholarship winner will continue work at the University of Illinois and further studies at the University of Chicago.

The Fairchild Scholarship Committee consists of H. C. Christensen, President of the AMERICAN PHARMACEUTICAL ASSOCIATION; Julius W. Sturmer, President of the American Association of Colleges of Pharmacy; Wm. H. Hankins, President of the National Association Boards of Pharmacy, and E. G. Eberle, Chairman.—Respectfully submitted, E. G. EBERLE, *Chairman*.

EDITORIAL NOTES

Editor: E. G. EBERLE, 10 West Chase Street, Baltimore, Md.

Members of the Council, A. PH. A.: S. L. HILTON, *Chairman;* CHARLES H. LAWALL, *Vice-Chairman;* E. F. KELLY, *Secretary;* H. V. ARNY, A. G. DUMEZ, H. A. B. DUNNING, H. C. CHRISTENSEN, C. E. CASPARI, J. H. BEAL, W. BRUCE PHILIP, T. J. BRADLEY. *Ex-Officio Members:* H. C. CHRISTENSEN, *President;* WALTER D. ADAMS, D. B. R. JOHNSON, *Vice-Presidents;* C. W. HOLTON, *Treasurer;* E. G. EBERLE, *Editor of the Journal;* A. G. DUMEZ, *Editor of the Year Book;* C. B. JORDAN, *Chairman of the House of Delegates.*

Collaborators: The Members of the Council; E. FULLERTON COOK, *Chairman,* U. S. P. Revision Committee; E. N. GATHERCOAL, *Chairman,* N. F. Revision Committee; Chairmen of the Sections, A. PH. A.; E. E. SWANSON, B. V. CHRISTENSEN, RALPH E. TERRY, JOS. G. NOH, J. T. LLOYD; J. W. STURMER, *President,* A. A. C. P.; CHARLES B. JORDAN, *Chairman,* Executive Committee, A. A. C. P.; W. M. HANKINS, *President,* N. A. B. P.; HENRY C. CHRISTENSEN, *Secretary,* N. A. B. P.

NEW AND NONOFFICIAL REMEDIES.

THE FOLLOWING ADDITIONAL ARTICLES HAVE BEEN ACCEPTED AS CONFORMING TO THE RULES OF THE COUNCIL ON PHARMACY AND CHEMISTRY OF THE AMERICAN MEDICAL ASSOCIATION FOR ADMISSION TO NEW AND NONOFFICIAL REMEDIES. A COPY OF THE RULES ON WHICH THE COUNCIL BASES ITS ACTION WILL BE SENT ON APPLICATION.

W. A. PUCKNER, *Secretary.*

ANTIMENINGOCOCCUS SERUM (See New and Nonofficial Remedies, 1930, p. 350).

The National Drug Company, Philadelphia.

Antimeningococcic Serum.—Marketed in packages of two 15-cc. syringes with apparatus for intraspinal injection; in packages of one 50-cc. double-ended vial with apparatus for intraspinal injection.

MERCUROCHROME-220 SOLUBLE (See New and Nonofficial Remedies, 1930, p. 271).

The following dosage form has been accepted:

Mercurochrome Suppository Aces: Suppositories representing a 2 per cent solution of mercurochrome-220 soluble (H. W. & D.) in a slightly aromatized hydroglycero-gelatin base; each suppository weighs approximately 6.5 Gm. (100 grains) and contains $^1/_{12}$ per cent of a mixture of equal parts of phenol, thymol, eucalyptol and menthol.

Prepared by Aces Laboratory, Inc.—*Jour. A. M. A.*, August 23, 1930.

WHITE'S COD LIVER OIL CONCENTRATE.—A cod liver oil concentrate in the form of tablets (wafers), each containing not less than 250 vitamin A units and not less than 100 vitamin D units.

Action and Uses.—White's cod liver oil concentrate possesses properties similar to those of cod liver oil so far as these depend on the fat-soluble vitamin content of the latter.

Dosage.—For adults, two to four tablets (wafers) three times daily; for children over 5 years, one tablet (wafer) three times daily after each meal; for infants, one tablet (wafer) daily, crushed and dissolved in the feeding.

Manufactured by the Health Products Corporation, Newark, N. J. (White Laboratories, Inc., Gloucester, Mass., distributor). No U. S. patent or trademark.

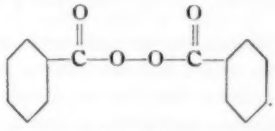
White's cod liver oil concentrate is obtained from cod liver oil by concentration of the unsaponifiable fraction of the latter. The vitamin A potency of White's cod liver oil concentrate is determined by a modification of the U. S. P. X method, differing from the latter in the use of a stock ration containing agar, irradiated yeast and "crisco," with starch replacing dextrin, and in the use of the appearance of xerophthalmia as the criterion for beginning the feeding of the ration; when assayed by this method the product is required to have not less than 250 vitamin A units per tablet. Comparative assays using the preceding method and that of the U. S. P. X have shown that the potency as determined by this method is fully the equivalent of that determined by the pharmacopœial method. The vitamin D potency is determined by comparison with a potent cod liver oil containing in each 0.75 Gm., 1 rat unit of vitamin D, the rat unit being defined as that amount of vitamin D which when uniformly distributed into a standard vitamin D deficient diet—ration 2965, *J. Biol. Chem.*, 64 (1925) 263—will produce in the metaphyses of the distal ends of the radii and ulnae of standard rachitic rats a narrow and continuous line of calcium deposits; when assayed by this method the product is required to have 100 vitamin D units.—*Jour. A. M. A.*, August 30, 1930.

BENZOYL PEROXIDE IN THE TREATMENT OF POISON IVY INTOXICATION.*

Poison ivy and poison oak are said to produce their intoxication by means of toxicodendrol, which becomes inert when oxidized. Various oxidizing agents, such as ferric chloride and potassium permanganate, have been used with some success in the treatment of this intoxication. These substances are applied in solution and their action, especially that of the latter, is of very short duration. It seemed to me that if one could find a dusting powder with oxidizing properties which could

* From an article by Paul D. Lamson, M.D., Nashville, Tenn., Department of Pharmacology, Vanderbilt University, School of Medicine—through *Jour. A. M. A.*, August 30, 1930.

be left in contact with the affected part, this would not only destroy any toxin on the surface of the skin but would absorb serum from breaking blisters and continue to act as a store of oxidizing material. Benzoyl peroxide seemed to have almost ideal properties for such a dusting powder. Its pharmacologic properties have been described by Loevenhart[1] as follows: It is a white crystalline, nondeliquescent substance with the formula



It is extremely nonirritating, watery solutions causing no irritation when dropped in the eye, and even the pure crystalline substance causing no irritation or disturbance of any kind when placed in the peritoneal cavity. It is also nontoxic when taken by mouth, being reduced to benzoic acid and excreted as hippuric acid. Saturated water solutions have been given intravenously without toxic effects. It has a definite antiseptic action and has been used as a dusting powder in wounds. Finally, as well as being an active oxidizing agent, it has a definite local anæsthetic action which is ideal in reducing the intense itching of poison ivy. This substance has therefore the properties of an ideal dusting powder for this particular condition and no contra-indications of which I am aware. It has been tried in thirty or more cases of ivy poisoning with the following results:

When benzoyl peroxide powder is dusted well over the lesion and kept in place by a light bandage, itching disappears in a short time, fifteen or twenty minutes, and may remain absent for as much as eight or ten hours after a single application. One or two physicians and nurses who have suffered great annoyance from itching in yearly attacks of poison ivy have stated that the effect was remarkable; that within half an hour after the application of the powder they became entirely unconscious of the lesions. Several of these cases which were seen early dried up and entirely disappeared within a day or so without spreading. In one boys' camp, where at the first part of the year boys were often confined to bed with very severe poison ivy lesions, it was found that after benzoyl peroxide was used no serious cases developed. The boys were so convinced of its beneficial action that they came in for treatment early, and after application of the powder no spreading of the lesions occurred.

On account of the varied lesions seen in poison ivy intoxication one would not expect this substance to be a certain cure in all cases. In many instances the lesion is a deep, small, hard blister, forming well under the skin which the powder could not be expected to reach. Other patients have a general anaphylactic action with intense edema, but many simple cases have only a localized patch of superficial blisters, which itch intensely and break on scratching, thus allowing the poison to spread all over the body. It is hoped that in such cases the application of this benzoyl peroxide powder may at least give relief from the annoyance of itching, reduce the spread of the intoxication, and possibly shorten its course.

CONCLUSIONS.

Benzoyl peroxide is a nonirritating, slightly antiseptic, definitely analgesic, nondeliquescent powder having active oxidizing properties. It is theoretically an almost ideal dusting powder for poison ivy intoxication, and has been shown in a small group of cases to reduce itching, to stop the spread of the intoxication, and possibly to shorten its duration.

[1] A. S. Loevenhart, *Therap. Monatsh.*, 19 (1905), 426–428.

NUX VOMICA AND STRYCHNINE IN PRESCRIPTION; MAXIMUM DOSE OF STRYCHNINE.

(*Chem. and Drug.* (1930), 112, 558.) The following prescription, with a large dose of powdered nux vomica, raises the question of the maximum dose of strychnine. Powdered nux vomica B. P., 2 grains; strychnine hydrochloride, $^1/_{16}$ grain; powdered cinnamon, 2 grains, make one powder; send six. These six doses are to be taken during forty-eight hours. This is evidently an intentional overdose, prescribed for atonic dyspepsia. The 2 grains of powdered nux vomica—$^1/_{40}$ grain of strychnine. The total single dose of strychnine is, therefore, $^1/_{40} + ^1/_{16}$ grain, which, for a big adult, is not dangerous. The B. P. doses are all within safe limits. The B. P. doses for strychnine alkaloid and for its hydrochloride are identical, although the former has, obviously, a much lower molecular weight. On these data, the dose for the hydrochloride would be about $^1/_{12}$ grain. The prescriber's confirmation is desirable, in this instance, if

the patient is unknown, or not of robust type. The maximum single dose of the "French Codex" is $^1/_{12}$ grain, and approximately $^1/_4$ grain in twenty-four hours. This prescription gives a dose of $^{21}/_{80}$ grain in twenty-four hours.—*Quarterly Journal of Pharmacy and Pharmacology.*

UNIVERSITY OF MARYLAND, SCHOOL OF PHARMACY RESEARCH FELLOWSHIP.

A research fellowship in pharmacy has been established in the School of Pharmacy, University of Maryland, by H. A. B. Dunning. The fellowship carried with it an annual stipend of $1000.00 and free tuition.

AMERICAN CHEMICAL SOCIETY.

The American Chemical Society met in Cincinnati, September 8th–12th. Prof. J. U. Lloyd was the Honorary Chairman, the Chairman being A. S. Richardson.

Among the contributors to the division of Medicinal Chemistry were Walter H. Hartung and James C. Munch, on "Preparation and Pharmacological Action of 4 Isomeric Phenyl Propylamines;" Edward Kremers on "Sitosterol from Echinacea;" Mortimer Bye on "Sodium Ricinoleate as Therapeutic Agent;" E. Fullerton Cook on "The Relation of Medical Chemistry to the U. S. P.;" Edward Kremers, "The History of Alkaloids;" L. E. Warren, H. R. Watkins and G. L. Keenan on "Improvements in Process for the Education and Determination of Alkaloids."

UNITED MEDICINE MANUFACTURERS OF AMERICA, INC.

The Ninth Annual Meeting of the United Medicine Manufacturers of America, Incorporated, was held at Cleveland, September 15th to 17th.

We are in receipt of the following Bulletins of the University of Wisconsin:

1. "On the Structure of Carbon Molecules," by Wilhelm Stroh, Research Assistant 1929, Laboratory for Pharmaceutical Chemistry.

2. "An Anatomical Study of *Monarda Fistulosa*, L.," by Karl H. Rang. Part of a Thesis submitted in Partial Fulfilment of the Requirements for the degree of Doctor of Philosophy.

3. "Tinctura Iodi Decolorata," by Karl Henry Rang. Thesis submitted for the degree of Master of Science, University of Wisconsin, 1925. This work was supported by a grant from the Research Committee of the A. PH. A., 1923–1924. Its publication was unavoidably delayed.

NOTE: It is necessary to hold "Book Notices and Reviews" for the October issue of the JOURNAL, when it is hoped to present quite a number of reviews.

PERSONAL AND NEWS ITEMS.

C. E. Nelson, coöperates with the public health department and his patrons and physicians by calling attention in his advertisment to precautionary measures by use of serums, etc.

A new pharmaceutical institute is under construction in Oslo and it is expected that the institute will be opened for instruction about the first of the year. The building fund totals about $350,000 and about $65,000 have been allowed for equipment. The plans and work are under the direction of Professor Farut.

Editor C. H. Farquharson, of the *Pharmaceutical Journal of New Zealand* has published a booklet of 24 pages on "An Historical Outline of New Zealand Pharmacy." *Editor* and *Secretary,* Walter D. Adams, of *The Texas Druggist,* has added further historical matter, in the September issue, to that dug out of various records during the past few years.

Ruth E. Miller, who received from the Philadelphia College of Pharmacy and Science a degree of Master of Science in Bacteriology in June 1930, has been named to continue the research under the auspices of the Chilean Government in the pharmacy of iodine.

During the past year, **Linewood Tice,** Philadelphia College graduate in pharmacy in 1929, has held this fellowship, assisted in the bacteriology phases of the research by Miss Miller. The former has been appointed to the chair of Professor of Theoretical and Operative Pharmacy in Baylor University, Dallas, Texas.

The **Hon. Thomas G. Murphy,** Neepawa, Man., who has recently been appointed Minister of the Interior in the newly formed Bennett Cabinet, Canada, is the first druggist in Canada to occupy a cabinet position in the Federal Government.

Ryoji Okazawa, head of the Japan Drug Manufacturing Company, is in Europe. He will attend the meeting of the League of Nations, as a civilian delegate.

E. C. Cripps, author of "The History of Ploughcourt," is preparing the biography of the late Sir William S. Glyn-Jones.

The death of **Richard Cranfield Wren** author of Potter's Cyclopedia of Botanical Drugs, has been announced.

Dr. P. Casparis, *Editor* of the *Swiss Apotheker Zeitung*, has been visiting in London during August.

Former President of the British Pharmaceutical Society, **Herbert Skinner,** has recently been a visitor in Switzerland.

William Mittelbach, *treasurer* of Missouri Pharmaceutical Association since 1896 was honored by friends with a donation of a $500 check and a resolution of esteem, signed by W. H. Lamont, *Chairman*, and Mrs. Minnie M. Whitney, vice-chairman, of Missouri Pharmaceutical Association; the testimonial was signed by 109 members of the Association. Mr. Mittelbach is a Life Member of the AMERICAN PHARMACEUTICAL ASSOCIATION and has served both as first and as second vice-president. He was president of Missouri Association in 1893 and member of the Missouri Board of Pharmacy for five years.

SOLOMON GERSHON.
Winner of the Fairchild Scholarship, 1930.

MRS. ALBERT SCHNEIDER PRESENTS BOOKS AND MANUSCRIPTS TO THE AMERICAN PHARMACEUTICAL ASSOCIATION.

Mrs. Albert Schneider, widow of the late Dr. Albert Schneider, presented a copy of each of the volumes published by the latter and a copy of each of the books of which he was co-author. She also donated the manuscript on "Microscopy and Micro-Technique" and that of the second edition on "Guide to Lichens." These books are to become part of the Library in the Headquarters Building and thanks are extended the donor. This sets an example for others; not only are endowments necessary, but donations which will add to the Library and Museum.

The Commercial Standards Monthly, published by the National Bureau of Standards of the U. S. Department of Commerce, for August, devoted a page to the standardization activities of the AMERICAN PHARMACEUTICAL ASSOCIATION, as outlined by Secretary E. F. Kelly. References are made to the National Formulary, Pharmaceutical Recipe Book; Committee on Unofficial Standards, on Pharmaceutical Research, etc., and the work of the recently organized Conference of Pharmaceutical Law Enforcement Officials.

MEDICAL SERVICE IN FEDERAL PRISONS.

On May 13, 1930, the President approved an Act of Congress which authorized the United States Public Health Service to provide medical service in Federal penal and correctional institutions under the Department of Justice. Henceforth the medical and psychiatric work in Federal prisons will be supervised and furnished by personnel of that Service. This new legislation is considered important in the field of penology and mental hygiene, and is part of the program for improving the conditions in Federal prisons, and also an effort to promote uniformity in the medical work of the Federal Government. This should also provide place for a number of pharmacists.

LICORICE USED IN PREPARING BEVERAGES IN ALGERIA.

Imports of licorice root and juice from France into Algeria during 1928 were: Licorice Juice —84 metric tons; Licorice root—30 tons; and Glycyrhizin—1.7 metric tons. Practically, the whole supply is stated to come from the south of France, where there is a large industry in the preparation of licorice products, some of the firms having houses both in France and in Spain.

There is no local manufacture of this product. Imports are in the prepared state, varying according to the uses for which it is destined. The principal use of licorice is in the preparation of hygienic and non-alcoholic drinks.

OBITUARY.

WILLIAM ARTHUR FROST.

William A. Frost, Honorary President of the AMERICAN PHARMACEUTICAL ASSOCIATION, 1925–1926 and member of the ASSOCIATION since 1876, died at his home in St. Paul, Minn., August 12th, aged 76 years. He was born in St. John, New Brunswick, April 11, 1854; here he received his early education.

Following his father's death, in 1870, he joined a brother, Thomas R. Frost who was a student at the New York College of Pharmacy, under whom he worked in a drug store owned by S. Y. Tuthill in New York City. For a short time he was employed by Eimer and Amend, after which he went into the employ of Caswell, Hazard and Company, with whom he remained until 1876, when Mr. Caswell retired from the firm to establish himself with W. M. Massey and L. R. Blackman in the new firm of Caswell, Massey and Company. Mr. Frost then returned to New York in the employ of the new firm. During the following winter he finished his pharmacy course and graduated from the New York College of Pharmacy in April 1877; thereafter he returned to Newport to assist in opening a new store for Caswell, Massey and Company, with whom he remained until the winter of 1878. Coming west in 1878, Mr. Frost located at Willmar, Minnesota, and formed a co-partnership with C. F. Clark under the firm name of Clark and Frost. Two years later fire destroyed the stock with almost a total loss; shortly after this the firm opened what was then considered the most up-to-date pharmacy in St. Paul. Since 1897, he devoted his entire attention to his pharmacy on Selby Hill.

Mr. Frost was active in the formation and was a charter member of the Minnesota State Pharmaceutical Association of which he was a past-president. He rendered valuable service in drafting and securing the passage of the Minnesota pharmacy law, and in the establishment of the College of Pharmacy at the University of Minnesota. Mr. Frost served as a member of the Minnesota State Board of Pharmacy from 1888 to 1900, and with the late H. G. Webster, then secretary of the Board, instituted the practical examination system still in use.

December 28, 1887, he married Miss Katharine Bean of Louisville. Kentucky.

PETER B. DIAMOND.

Peter B. Diamond, member of the AMERICAN PHARMACEUTICAL ASSOCIATION since 1920, died August 18th, following a heart attack while motoring in New York City with his daughter. The deceased was Honorary President of the New York Retail Druggists' Association, and a former president of New York State Pharmaceutical Association, also chairman of the New York Pharmaceutical Conference and head of the New York Pharmaceutical Society. Mr. Diamond was born in Kieff, Russia, sixty-five years ago. There he received his early education, and came to the United States in 1881.

The deceased was owner of drug stores at various locations in New York City, disposing of them and re-locating; recently he had again engaged in the retail drug business.

As an organization man, Mr. Diamond became active in 1896, with the formation of the New York Retail Druggists' Association. The deceased is survived by his widow and a daughter, Mrs. Irving Low.

Ralph C. Root, member of the Vermont State Board of Pharmacy, died August 3rd, following a heart attack, age thirty-four years. Mr. Root was born in Brattleboro and here he resided during his life. After completing his preliminary education he matriculated at the Massachusetts College of Pharmacy, where he graduated, with honors, in 1916. The attendance at the funeral ceremonies testified to the esteem in which he was held.

The deceased is survived by his widow and mother.

MRS. CHARLES HOLTON.

Sympathy is expressed to Treasurer Charles W. Holton, AMERICAN PHARMACEUTICAL ASSOCIATION, and members of the family, because of bereavement by the death of his mother on August 29th. Mrs. Holton was the widow of one of our former presidents, who was highly esteemed as a citizen of Newark, N. J., and as a member of the AMERICAN PHARMACEUTICAL ASSOCIATION. A month or more ago, Mrs. Holton met with an accident by a fall in coming down stairs at her home; later, pneumonia developed which resulted in death. The deceased was 78 years of age, but active until the accident. Mrs. Holton had a beautiful home at Essex Fells, adjoining that of her son.

Dr. E. Alberta Read, assistant chief chemist of the microanalytical laboratory of the Bureau of Chemistry, Department of Agriculture, died at her home in Washington, September 1st. She had served in the laboratory continuously since 1907. Dr. Read was a native of Haverhill, Mass., and was a graduate of Mount Holyoke College, receiving degrees of M.S. and Ph.D. from Cornell University and M.D. from George Washington University.

We are advised of the death of **Mrs. George W. Sohrbeck** of Moline, Ill., on June 12th. A brief notice was given of the death of her husband, in the August number, on page 927; he died June 2nd.

Mrs. Sohrbeck had been in failing health for some time and the shock of her husband's death was a contributing factor in the illness which resulted in her death.

Mrs. Sohrbeck took an active part in civic affairs and also in the church to which she belonged.

SOCIETIES AND COLLEGES.

ARIZONA.

At the eighth annual convention of the Arizona Pharmaceutical Association, held in the city of Prescott, September 2nd and 3rd, the following officers were elected for the ensuing year:

President, Jack Robertson, of Phoenix; *Vice-President,* Sam Ensminger, of Prescott; *Secretary,* Arthur Lee Phelps, of Phoenix, who is also *Secretary* of the Arizona State Board of Pharmacy; *Treasurer,* H. A. Twining of Phoenix; *Members of the Executive Committee, Chairman,* Fred C. MacAlpine, of Kingman; Guy Crouch, of Douglas; Fred W. Moore, of Flagstaff; G. E. Richerson, of Casa Grande; Harold Copp, of Miami; T. Ed. Litt, of Tucson.

The business meetings were particularly interesting. A program is enclosed. In addition to the scheduled speeches one written by Mr. H. C. Christensen, President of the AMERICAN PHARMACEUTICAL ASSOCIATION and Secretary of the National Association Boards of Pharmacy written for the pharmacists of Arizona was read by Mr. Phelps, and enthusiastically received by the delegation.

Chairman Arthur Lee Phelps, of the Resolutions Committee introduced nineteen resolutions, all of which were adopted. Among them were those which follow.

The request of the Texas and New Mexico State Pharmaceutical Associations that the Arizona Association join with them in holding a tri-state meeting next year was unanimously adopted, and Mr. Edward L. Dorsey of Phoenix was named Chairman of a committee to make the arrangements for this meeting.

Pharmaceutical Recipe Book.

Resolved that the Arizona Pharmaceutical Association commend the general excellence and usefulness of the Pharmaceutical Recipe Book published by the AMERICAN PHARMACEUTICAL ASSOCIATION, and that pharmacists everywhere be urged to place this volume upon their shelves of reference works with the U. S. P., N. F. and New and Nonofficial Remedies.

New and Nonofficial Remedies.

Resolved that the Arizona Pharmaceutical Association commend the general excellence and usefulness of New and Nonofficial Remedies published by the American Medical Association and that pharmacists everywhere be urged to place this volume upon their shelves of reference works with the U. S. P., N. F. and Recipe Book.

Resolution in favor of discontinuing "Assistant Pharmacist" grade was adopted; also changes in present Pharmacy Law; recommendation of arranging for the appointment of Board members, so that the terms of all members will not expire at the same time, and that the appointments be made from a list recommended by Arizona Pharmaceutical Association.

A pharmacy corps in the Medical Department in the U. S. Army was strongly endorsed by resolution, and the active support of it was asked of Hon. Lewis R. Douglas, member of the House Committee on Military Affairs.

The phrase "recommended by all reliable druggists" in the advertising of patent medicines was objected to by resolution.

College prerequisite is to be included in the new pharmacy law, and the Arizona Pharmaceutical Association is to be incorporated.

The Capper-Kelly bill was heartily endorsed.

Dr. Harry T. Southworth, President of the Arizona State Board of Health, spoke on "What I Like and What I Don't Like about Modern Drug Stores." "Drugs and the Dentist" was the subject of Dr. Ralph J. Roper, of the Arizona Dental Association.

DELAWARE PHARMACEUTICAL SOCIETY.

The 43rd annual meeting of Delaware Pharmaceutical Society was held at Rehobeth Beach, July 8th and 9th. Among the speakers of the Convention were Dr. Wilmer Krusen, Prof. Frank X. Moerck, Jacob S. Beetem, Secretary E. F. Kelly, President L. S. Williams of the Maryland Association, Aquilla Jackson, R. L. Swain and others.

Papers were presented by Dr. John C. Krantz, Jr., on "Carbohydrated Metabolism." Chairman Robert J. Ruth gave an address on "The Pharmacist Gets a Break." Prof. Paul C. Olsen reported on the work of the Druggists' Research Bureau.

Reports were made by delegates to various state and national conventions; that for the AMERICAN PHARMACEUTICAL ASSOCIATION was made by George R. Rhodes.

President W. R. Keys in his address referred to the status of pharmacy in the drug business, and its progress.

The following officers were elected for the ensuing year;

President, Harry J. Pettyjohn, Milford; *First Vice-President*, Edwin Challenger, 2nd, New Castle; *Second Vice-President*, Marcus Reed, Camden; *Third Vice-President*, W. E. Hastings, Selbyville; *Secretary*, Albert Doughery, Wilmington; *Treasurer*, Pete Bienkowski, Wilmington.

RESEARCH FELLOWSHIPS.

Research Fellowships supported by Industry are reported in the "News Edition" of *Industrial and Engineering Chemistry*, for August 10th; among them:

AMERICAN PHARMACEUTICAL ASSOCIATION. Glass container research fellowship at Columbia University. $2000.

FRITZSCHE BROS., INC. Fellowship at Columbia University, for research in perfume chemistry. $3000; fellowship at University of Wisconsin, for study of volatile oils and related subjects. $500.

MALTBIE CHEMICAL CO. Fellowships for the study of creosote are maintained at: Philadelphia College of Pharmacy; Princeton University.

MERCK AND CO. Fellowship at Rutgers University, for pharmaceutical problems of a fundamental nature. $3000; fellowship at Princeton University in analytical chemistry. $1000.

WILLIAM S. MERRELL CO. Fellowship at University of Cincinnati, College of Medicine, for research in biochemistry. $1500.

E. R. SQUIBB AND SONS. Fellowship at University of California, for the study of oral hygiene; fellowship at University of Minnesota, for the study of arsenicals; fellowship at University of Wisconsin, for the study of nutritional problems; fellowship at Yale University, for the study of organic syntheses; research associate at Bureau of Standards. Project: Properties of gaseous mixtures.

UPJOHN CO. Scholarship at Kalamazoo College, for research in chemistry. $750; scholarship at University of Michigan, for research in pharmacology. $1000; scholarship at University of Michigan, for research in pharmacy. $750.

WILLIAM R. WARNER AND CO., INC. Fellowship at Johns Hopkins University, for study of chemistry. $1000.

The Philadelphia College offers a new graduate fellowship in pharmaceutical research, made possible by the coöperation of Eli Lilly & Company, pharmaceutical manufacturers of Indianapolis. The fellowship carries with it a compensation of $750 and free tuition.

The candidate will devote himself to a study of enteric coatings for tablets and capsules. During the past year, Milton Wruble, chemical engineering graduate from the University of Michigan, received his Master of Science degree from the Philadelphia College for original research in the field of enteric coatings for tablets. The purpose of the fellowship is to develop further the fundamental findings of Milton Wruble. Candidates for the fellowship must hold at least the degree of Bachelor of Science in pharmacy, chemistry or related subjects to be eligible for consideration. Opportunity is afforded the holder of the fellowship to enroll for graduate courses leading to the degrees of Master of Science and Doctor of Pharmacy.